INDUSTRIAL-ARTS MAGAZINE

Incorporating: HANDICRAFT and the ARTS AND CRAFTS MAGAZINE

Published Monthly by

THE BRUCE PUBLISHING COMPANY, Milwaukee, Wis.

Established 1891

FRANK M. BRUCE, Publisher

W. J. LAKE, Eastern Advertising Manager E. E. KRILL, Western Advertising Manager H. KASTEN, Subscription Manager

OFFICES

MILWAUKEE: 129 MICHIGAN ST. New York: 112 East 19th St. Chicago: 64 W. Randolph St.

TABLE OF CONTENTS

Vol. VI **April, 1917** **No. 4**

Entered January 20, 1914, as second-class matter in the Postoffice at Milwaukee, Wis., under the Act of March 3, 1879.

Member of the Associated Business Papers.

SUBSCRIPTION INFORMATION.

The subscription price of the *Magazine* is $1.50 per year, payable in advance. Postage for Canadian and Mexican subscriptions, 35 cents; for foreign countries, 50 cents. Single copies, not over six months old, 25 cents; more than six months old; 50 cents. Notice for discontinuance of subscriptions must reach the Publication Office in Milwaukee, at least fifteen days before date of expiration, with full balance due to date. Notices for changes of address should invariably include the old as well as the new form of address. Complaints of non-receipt of subscribers' copies cannot be honored unless made within fifteen days' after date of issue.

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The board of editors invites contributions of all kinds bearing upon the Industrial-Arts Education, Manual Training, Art Instruction, Domestic Science, and related subjects. Unless otherwise arranged for, manuscripts, drawings, projects, news articles, etc., should be sent to the Publication Office in Milwaukee, where proper disposition will be made. The Board of Editors meets once or oftener each month in Chicago, and all contributions submitted are given careful attention. Contributions when accepted are paid for at regular space rates. In all cases manuscripts should be accompanied by full return postage.

The Industrial-Arts Magazine is on sale at Brentano's, 5th Ave. and 27th St., New York City; John Wanamaker, Market St., Philadelphia; A. C. McClurg & Co., 218 S. Wabash Ave., Chicago.

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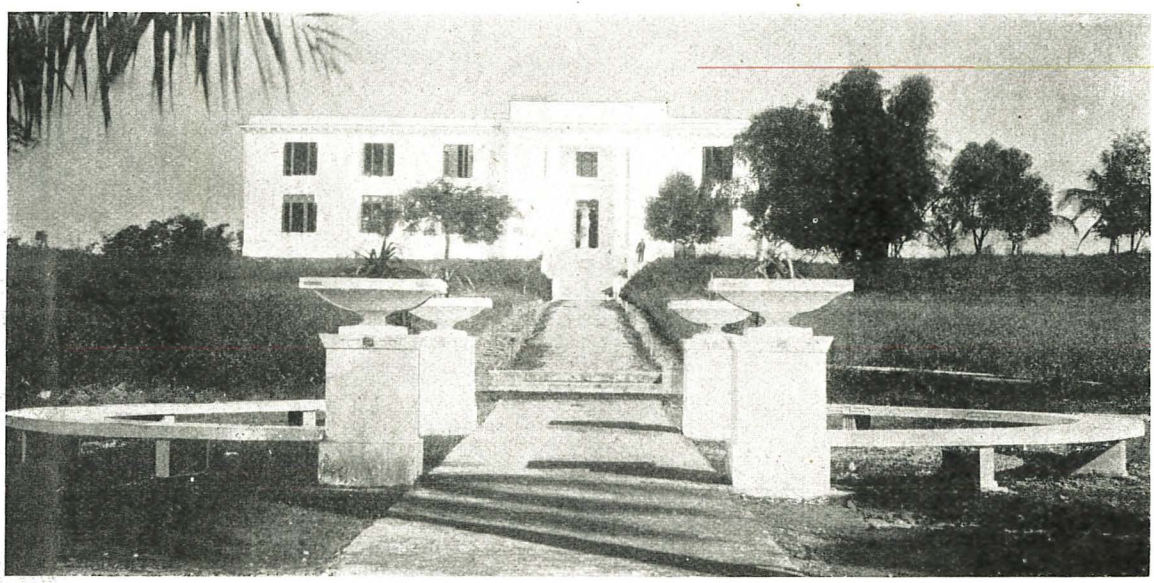


Fig. 11. THE COMPLETED PROJECT.

A PROBLEM IN CONCRETE

Herman Hjorth, Professor of Manual Training, University of Porto Rico

A COURSE for teachers of Home Economics and Industrial Arts is generally given each summer at the University of Porto Rico. Among the subjects on last summer's program for Industrial-Arts teachers was a course in concrete construction. While this subject was entirely new to some of the teachers, others had had considerable experience in the use of this material. I was, therefore, confronted with the task of finding a suitable problem for this advanced part of the class. Since this problem had to be fairly advanced, a group-problem of a rather ornamental design seemed to be the most suitable.

In the center of the campus several paths converged into an elliptical plot. In this ellipse, we finally decided to build two half circles of benches, which we thought would be very useful and convenient and, at the same time, suitable and conform to the surroundings.

As shown in the drawing, Fig. 1, a central path divides the ellipse into two equal halves, and a circular path follows its circumference, and is joined by four other paths. It was decided to construct one half circle of benches on each side of this central path, so that the two columns in which the half circle terminated would be in line with the path and exactly opposite the two columns of the other semi-circular bench. Two centers were therefore chosen, one on each side of the central path, the distance between them being equal to the width of the path. The ellipse which was formerly very irregular was then laid out, so that the long axis was made equal to the short axis plus the width of the path.

While the work of leveling the ground was being done by hired labor, further details of the construction and ornamentation were worked out in the shop, and some of the preliminary casting done there. It was decided to build the benches of white cement and marble dust, and to decorate them with inlaid faience and gold tiles. But as white cement is twice as expensive as the ordinary kind, and marble dust costs $1.50 a hundred pounds, or about eighteen times as much as sand, it was evident that we had to be very economical. We could therefore only make a shell, so to speak, of the white concrete and fill this with ordinary concrete. This made our problem far more difficult, but also much more interesting and instructive.

After having decided all these details and worked them out on paper in the mechanical drawing room, we began the work by constructing the forms for the supports. Referring to the cross section, Fig. 2, the method of construction will be easily understood. As shown, the footings are constructed entirely of ordinary concrete, designated here as gray concrete, so as to distinguish it from the white. The forms were made of four pieces of wood nailed together

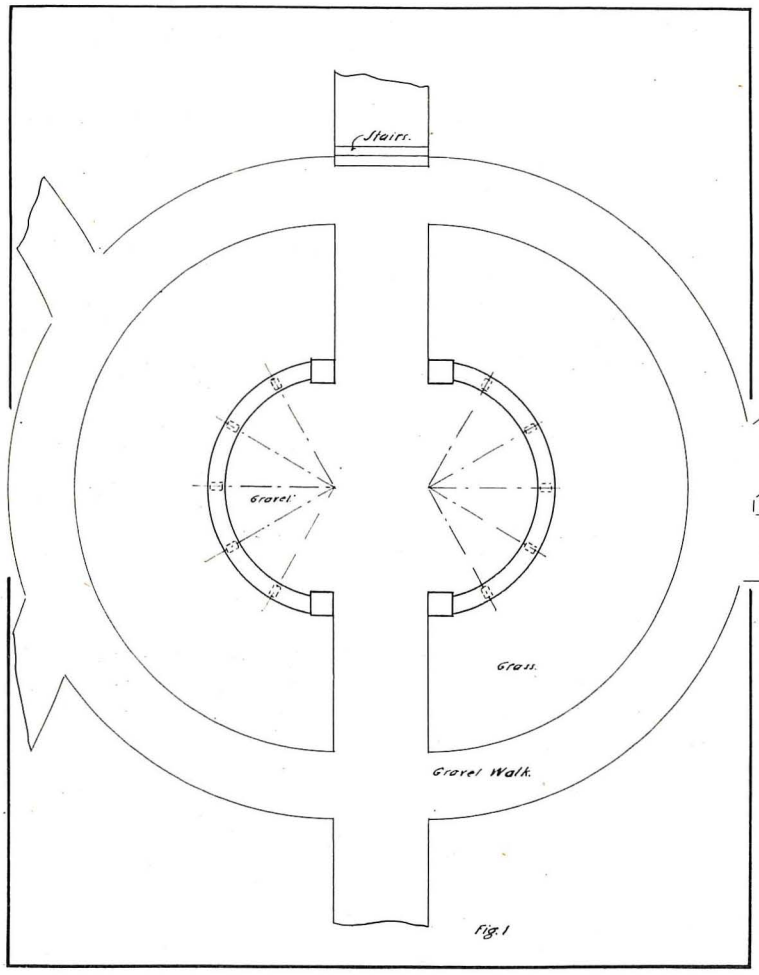


Fig. 1

like the sides of a box. No bottom was put in, but the forms simply placed on a concrete floor and filled. A heavy piece of paper was placed on the floor, so that the fresh concrete should not adhere to it. While still wet, three $\frac{3}{8}''$ reinforcement irons were placed in these footings, so that they would project 16″ above them.

The supports consisted of two parts. The lower part was merely a slab of white concrete, 2″ thick, with a rectangular opening thru the center. The form for this is shown in Fig. 3. It is simply a box without a lid, and the rectangular opening in the center is formed by a piece of wood. This is beveled slightly on all sides (draft), so as to come out easily when the concrete has hardened. A heavy piece of galvanized wire was used for the reinforcement of these slabs.

The upper part of the supports was made somewhat similar to a square flower pot. The forms are shown in Fig. 3. The outside form was made like a box, the construction of which is shown in Fig. 4. Three-quarter inch boards, 12″ long, were used. It is important that the boards should be of exactly the same thickness and well jointed, but they need not be hand-planed however. Before the box was put together provision had to be made for the recesses in the front part of the supports to be inlaid with tiles. This was done by nailing on strips and squares of wood of the right dimensions and placing them in the proper relationship. They were given plenty of draft. The core was made to the dimensions given in Fig. 2. It was then cut into three pieces as indicated. These three pieces were held together with a strip of

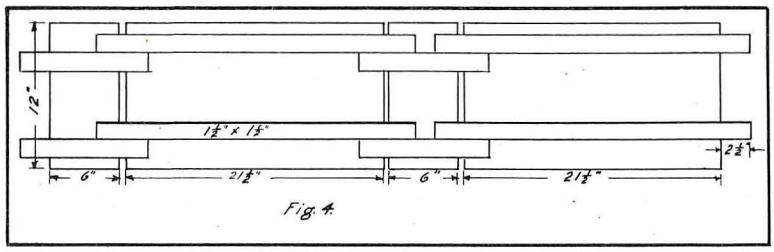


Fig. 4.

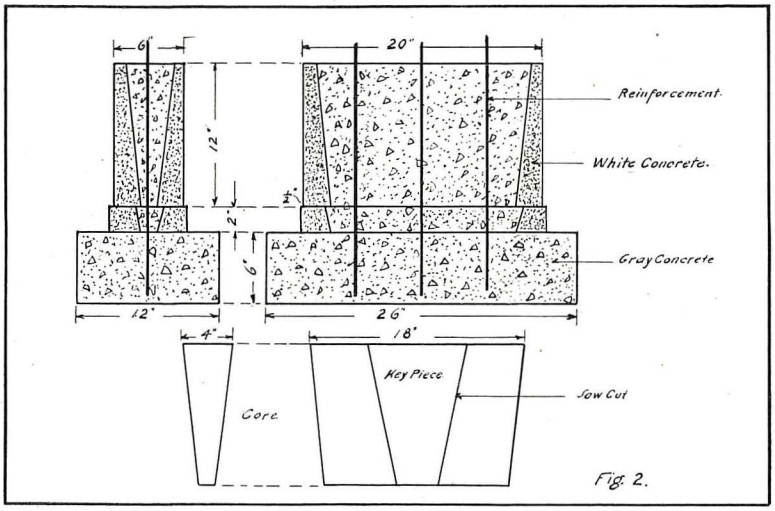


Fig. 2

wood nailed to the top, and also to the sides of the box, and they were located in the center of the box by means of dowels in the bottom board. Both the box and the core were well greased before the concrete was poured. Ordinary automobile grease, thinned with kerosene to the consistency of thick glue, will be found to be well adapted to this purpose. When the concrete had dried about 24 hours, the bottom was removed and the middle piece (the key) of the core driven out; the other two pieces then came out easily. If a core of this kind were made in one solid piece, it would be impossible to get it out without breaking the concrete, hence the

necessity of the three pieces. No reinforcement was used for the castings.

After the ten supports had been cast and the surfaces finished, the preparation of the ground had been so far completed that the work of erection could be started. As shown in the drawing, Fig. 1, the supports were placed in such a way that they formed angles of 30 degrees with each other, and angles of respectively 30, 60, and 90 degrees with the central path. A hole approximately equal in depth to the thickness of the footings was then dug for each footing, after which they were placed in the exact position, level, and exactly at the same height. In order to keep them firmly in place, the holes around the footings were filled with concrete. The base and the upper part of the supports, Fig. 3, were then slipped over the three reinforcement irons, placed in the correct position by means of the theodolite and the steel tape, and filled with ordinary concrete, making them solid and firm.

After the problem of the supports had thus been disposed of, the columns were the next link in the chain of construction to be considered. As will be seen from Fig. 5 and from the photograph, Fig. 6, each of the four columns was built up of four parts,

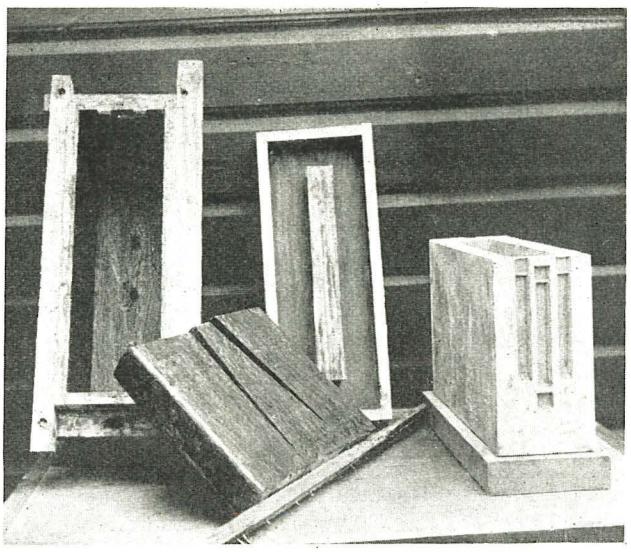


Fig. 3

viz., the footing, a; the base, b; the body, c; and the top, d. The place for the footings was first located and excavated. The mould was then placed in the correct position, level, and at the correct height, the same as the footings for the supports. In order to provide drainage for the plants to be placed in the vases on the columns later on, an opening was made in the center of the footings about eight inches square. This form was filled with ordinary concrete, reinforced as shown, carefully tamped and smoothed.

In the meantime the bases had been constructed in the shop, the method of procedure being somewhat similar to that used in making the supports. First a thin shell of white concrete had to be made, and secondly this had to be reinforced by filling it with ordinary concrete. But as it was found undesirable to make the base solid on account of weight and cost of material, the problem was finally solved in the following manner: The forms were made in the same manner as those for the supports, but with two cores, the larger one for the white concrete, and the smaller one for the gray concrete, Fig. 7. A smooth cement floor was again used instead of a bottom of wood, the core, b, placed in the form, and the white concrete poured. Four or five hours afterwards the core, b, was carefully removed and the core, c, placed in position. The reinforcement was then placed between the white concrete and the core, c, and the gray concrete poured. The interval between the casting of the two kinds of concrete was made as short as possible, so as to insure a perfect bond. After the gray concrete had hardened about 24 hours, the core and form

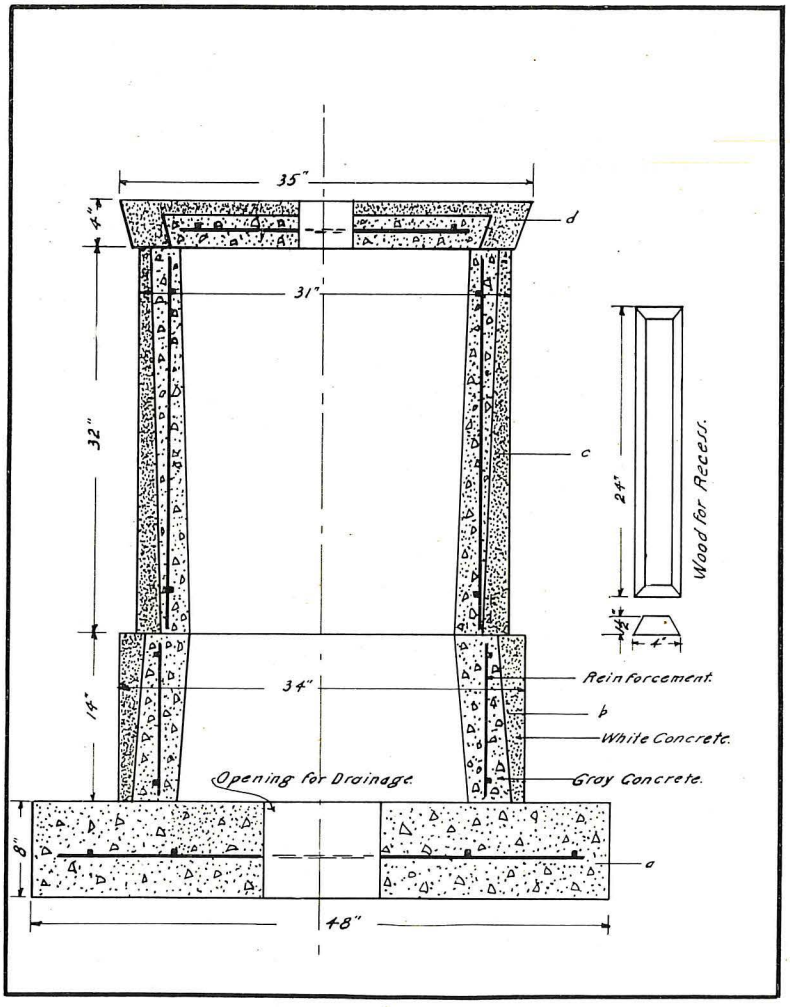


Fig. 5

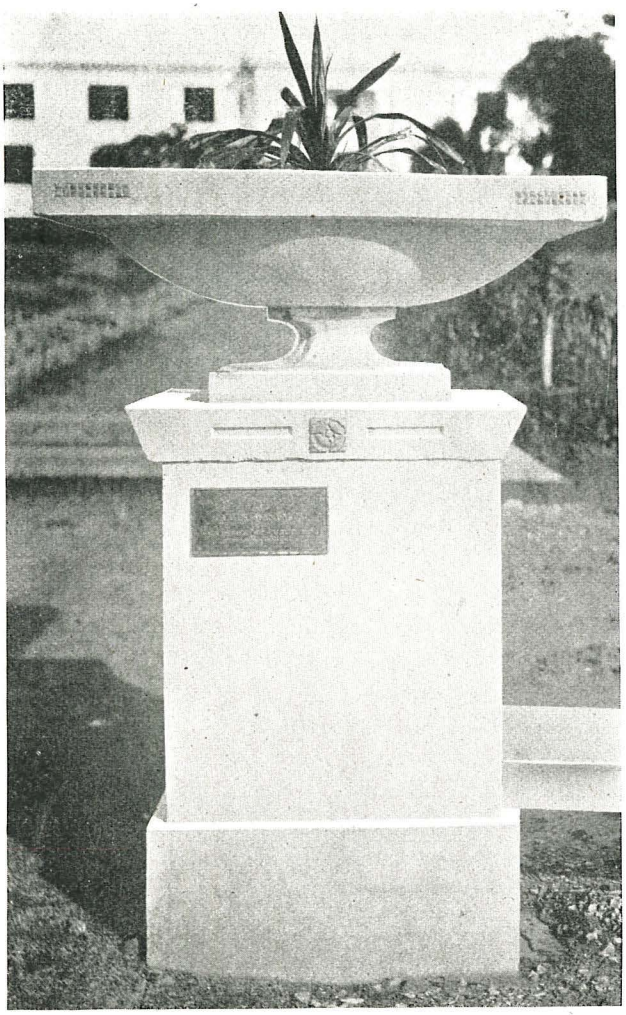


Fig. 6.

were removed. In making such cores, two opposite sides should be constructed with a key piece as shown in the drawing, Fig. 7, which may easily be removed, thereby facilitating the removal of the entire core. This should always be done before the outside is removed, so as to prevent cracking the concrete by any undue amount of strain necessary for removing the core.

After completion, the four bases were placed in position on the foundations, but the reverse of the way in which they were cast, so that the end having the thickest layer of white concrete was placed face up, Fig. 5. As the body, c, would be too heavy to transport, the forms were placed directly on the base, and the concrete to fill them brought in wheelbarrows. The forms were made with two cores exactly in the same manner as for the base, with exception of the recess, which had to be made in one of the sides to allow for the joining of the seat to the columns.

The top, d, was also made of both white and gray concrete, but in this case the gray concrete was cast first in form a, Fig. 7. The outer form had to be provided with beveled strips of wood to allow for the inlay. The joints were all "hopper." A hole for the drainage was provided very easily by placing a one gallon paint can in the center before the concrete was cast.

The work had now progressed so far that the construction of the two seats could be undertaken. In order to get a full size drawing of these to work from, an angle of 30 degrees was laid out on the floor of the shop with the aid of the theodolite. The length of the radii was measured and a full size detail of a section of the bench between two supports laid out from the drawing, Fig. 9. A full size detail of the section between a column and a support was obtained in the same manner. Templates of one-inch boards were then made to fit these outlines, and from these templates the bottom of the forms were cut. These, however, were made of 2″ planks, securely tied together with cross pieces nailed to the underside, as they should be able to support considerable weight, the seat

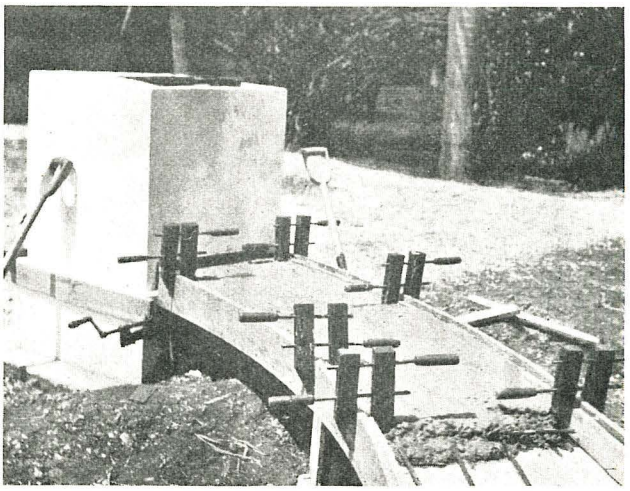


Fig. 9.

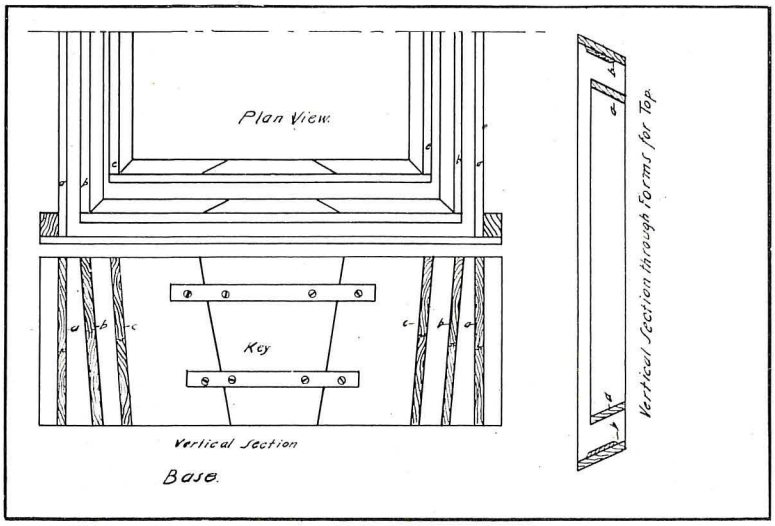


Fig. 7.

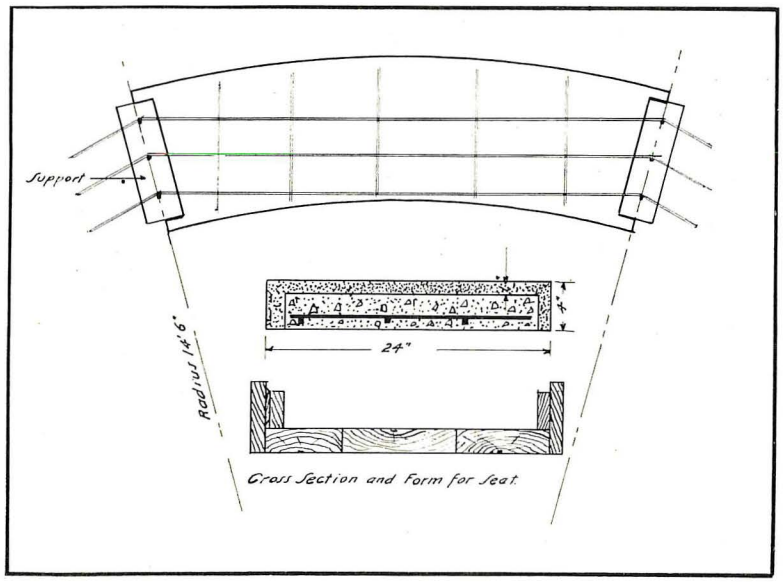


Fig. 8.

being 4″ thick and 24″ wide. They were fitted in place, carefully leveled and securely braced.

The back and front were made of 1″ boards, 6″ wide. The places for the inlay were then measured and suitable pieces of wood nailed in place. Two 1″ boards, 3″ wide, were prepared in the same manner as the 6″ boards and clamped to the inner side of these, Fig. 9. Three $\frac{3}{8}$″ reinforcement irons were placed as shown in Fig. 8, and wired to the projecting pieces of each support. Across these irons other pieces 20″ long were placed every two feet. As the underside of the seat is the part in tension the reinforcement was placed about $\frac{3}{4}$″ over the bottom boards, and not in the center. The forms were now filled with gray concrete to the level of the 3″ boards, Fig. 9, which after a couple of hours were carefully extracted, after which the white concrete was poured in, making the whole one solid piece of concrete. The front and back boards were taken off after 24 hours, and the work of rubbing with the carborundum stone begun before the concrete had time to harden. The bottom of the molds, and the supports, were left in place for a whole week. They were then used over again for the second seat.

While working on the seats, the vases were cast in the shop. The process of construction was identically the same as that described in my article "Plaster Molds for Concrete Pottery" published in the *Industrial-Arts Magazine* for August, 1916. They were made altogether of white concrete and reinforced with $\frac{3}{8}$″ reinforcement irons. An idea of their size can be gathered from the fact that the upper part measured 4′ square, and that it took eight men to lift that part into place. The tiles were bought from the Rookwood Pottery Co., and from the Mosaic Tile Co. The arrangement of the inlay is shown in Figs. 6 and 10, the first not being fully completed. The finished job is shown in Fig. 12. During the process of construction the teachers decided to commemorate their work and gift to their Alma Mater by placing a suitable bronze tablet on one of the columns. The tablet, which may be seen in Fig. 6, was designed by the writer and executed by the Gorham Co., New York. The teachers are indebted to Architect Antonin Nechodoma, San Juan, P. R., for the design of the vases, as well as for numerous helpful and valuable suggestions regarding the work in general.

In conclusion a few facts concerning the mixtures used would perhaps not be out of place. The mixtures for white and gray concrete thruout the project were as follows: For white concrete, 1 part white cement (Atlas), 1 part marble dust, and one-sixth part of ordinary gray cement; for gray concrete, 1 part cement, 2 parts sand, and 4 parts of $\frac{3}{4}$″ broken stone. A little gray cement was used in the white mixture, so as to make a better bond, as the white cement and the marble dust alone have a tendency to form cracks while drying. These cracks generally do not penetrate all thru the casting, but usually appear only on the surface. It was found that a small amount of gray cement added to the white mixture prevents cracking. When it is possible, the forms should always be well shaken while the concrete is being poured and again immediately after, so as to prevent air bubbles from forming. If, in spite of this precaution, it should be found afterwards, that the surface of the concrete is marred by large air holes, these can be filled with a little of the original mixture. This, however, should be done while the concrete is still green. Brushing the surface of ordinary concrete with dilute muriatic acid, and the surface of white concrete with dilute sul-

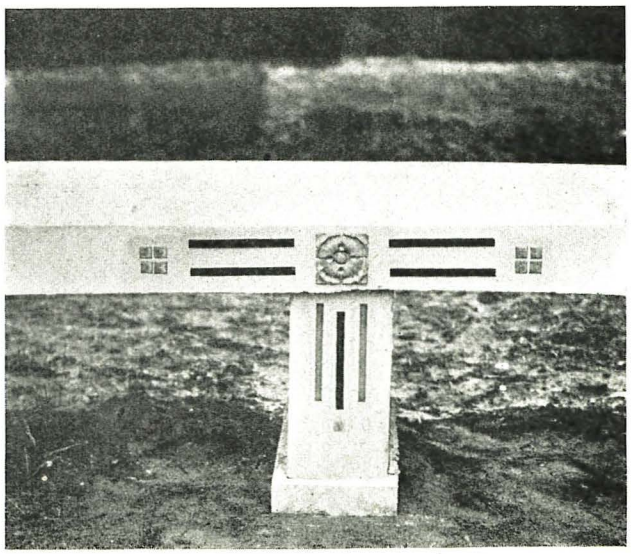


Fig. 10.

phuric acid, will roughen it and thereby strengthen the bond between the old and the new concrete. As white concrete dries much more rapidly than ordinary concrete, it is advisable to keep it covered with wet cloths or bags while drying. The mixtures were used quite wet, especially the white mixture. After taking the castings out of the molds, they should be left to dry in the shade and frequently sprinkled with water. All the castings in this project were rubbed with carborundum stone to make them smooth. This should be done about 48 hours after casting the concrete, while it is still green and soft. A description of the rubbing process will be found in the article above referred to.

COSTUMES FOR IVANHOE

Alta E. Thompson, Western Illinois State Normal School, Macomb, Ill.

SCOTT'S "Ivanhoe" was dramatized by the pupils of the eighth grade of the Western Illinois State Normal School for their annual play. The program, printed by the boys of the class in their shopwork, appears in this article. The costumes were made by the girls with suggestions and help from mothers and the teacher. The descriptions in Ivanhoe are so complete that they can be followed easily and modified to be inexpensive. Not one of the costumes cost more than $1.25, and the material in many of them can be used later for sofa cushions, draperies, etc.

As the play was given in the evening, we wanted to have as much color as possible. Cedric's tunic was red, his cape bright green trimmed with fur; the belt green with tinsel sewed on in designs. The Templar's costume was also dark red sateen. The Black Knight wore a black cambric tunic, and for a cape, a grenadine dress skirt with a fur collar hung from the shoulders. His helmet was made from an old derby hat according to the directions in the Boy's Handy Book. It was covered with black paper and ornamented with a black plume. The other helmets were made in the same way, but were covered with tinfoil. Prince John was gorgeous in a yellow cambric costume, a long purple cape, a real Knight Templar hat and sword.

Wamba followed the directions in Ivanhoe, using cambric of the various colors. Prior Aymer wore a priestly robe of scarlet cambric and a collar of gold paper. Robin Hood and his men had simple costumes of bright green. In addition, Robin Hood had a breadth of sateen draped from his shoulders to form a cape. The stockings were dyed to match the costumes.

The ladies' gowns were long and flowing, with trains of contrasting colors, and motor veils over the heads. The girls cut figures from cretonne and wall paper and outlined them with tinsel. These ornamented the girdles, yokes and sashes, and added greatly to their attractiveness. Copies of the Abbey Holy Grail pictures gave many suggestions for all of the costumes as well as for the shields and banners.

The boys got quantities of round and oval pieces of metal from the sheet metal factory, and they bored holes in these and sewed them on various colored cloth tunics to make armor. One boy made an armor of heavy pasteboard which he painted with the kind of silver paint used on radiators.

Characters in "Ivanhoe" dramatized by eighth grade pupils of the Western Illinois State Normal School.

Ivanhoe as the palmer, wore a long black cambric coat, cambric over the head forming a cape over the shoulders, and a black felt hat. He carried a palmleaf. In the second act he wore armor and a helmet, described above, and a heavy white cotton cape with a large gilt paper cross on it. The cape was an afterthought of his own, and he made it by cutting the strings off his cooking class apron and turning in the sides.

Friar Tuck's robe was made from two old brown burlap curtains, and the top of an old Panama hat was shaped to make the bare spot on his head.

The banners were made from bits of sateen and cambric, figures and crosses cut out and pasted on contrasting colors. Three were painted. The banners added a note of color to the stage. The shields were of pasteboard, painted. To add color in the second act, dark red curtains were used for the table cover; a basket of fruit and flowers and silver cups, athletic trophies, were on the table.

Before all of the colors for the costumes were decided upon, a rough diagram was made on the blackboard, and colored crayons were used to work out the color scheme for the act in which all of the characters would appear. Then selections were made which would avoid sameness and clashing. The bright greens of Robin Hood's men were balanced on the other side by the ladies' gowns. The servants were in brown, the knights with bright armor and shields scattered over the stage wherever the effect would be made better by their presence. The banners were held high at the back of the stage. Two knights stood near the Black Knight for contrast. The predominating colors were red and green.

The scenery—forest scenery—was unchanged thruout, and the properties reduced to a minimum. Act I—a stump. Act II—table and benches. Act III—small platform and big chair for a throne, a laurel crown, a gold paper crown. Act IV—(a) nothing, (b) small table, benches, steins, paper pie, harp, and a dog (a real one that acted splendidly). Act V—platform used in Act III upon which Ivanhoe lay. Act VI—gunnysacks filled with paper—booty for Robin Hood's men.

The costumes were surprisingly good looking and the color effects excellent. The illustrations, drawn by an eighth-grade girl, will give some idea of the appearance of several of the costumes. The enthusiasm of the boys and girls from the time the readings began to the final presentation of the play, was proof positive that the work was worth while. Besides absorbing a classic in such a way as to give their interpretation to others, they learned how to make simple materials into attractive costumes which were suggestive and appropriate for each character.

Illustrations of several costumes drawn by Eighth Grade Girl.

Development of Water Colors in Primary Grades

Seventh Article

BIRD PAINTING

Martin F. Gleason, Supervisor of Art and Construction, Joliet, Ill.

CHILDREN love to represent those things which have life and power to move. They are willing to work very hard to catch and record the characteristics of movement. There is no better medium for the expression of action than the well filled brush. The nature of the tool insures simplicity and is instrumental in leaving traces of freedom in action which other mediums fail to produce, especially in the hands of young children.

The birds, of all live creatures, find their way into the hearts and minds of young children most easily. The song, the brilliant colors and the activities of these feathered individuals are the factors which bring them into favor. A few very pleasant and profitable weeks may be spent each spring in painting the birds at the time when they are returning from the south.

It is quite impossible, of course, to bring the birds of the fields and forests into the room to use as live models. In most cases it is these kinds of birds which are found most interesting to children. Much valuable information as to shape, color and action may be gathered thru observation of the birds, as they are found in the open, if there is opportunity for this kind of work. By asking suggestive questions as to the position of the bird when eating, drinking, singing, or moving about the children may be directed in their efforts in observation.

Much valuable information concerning color may be gathered from pictures printed in colors. Do not depend too much on these, however, because many times there is too much detail to be of any great help in application of color with young children. The scheme of color in any bird shape should be reduced to the least possible number of definite spots,

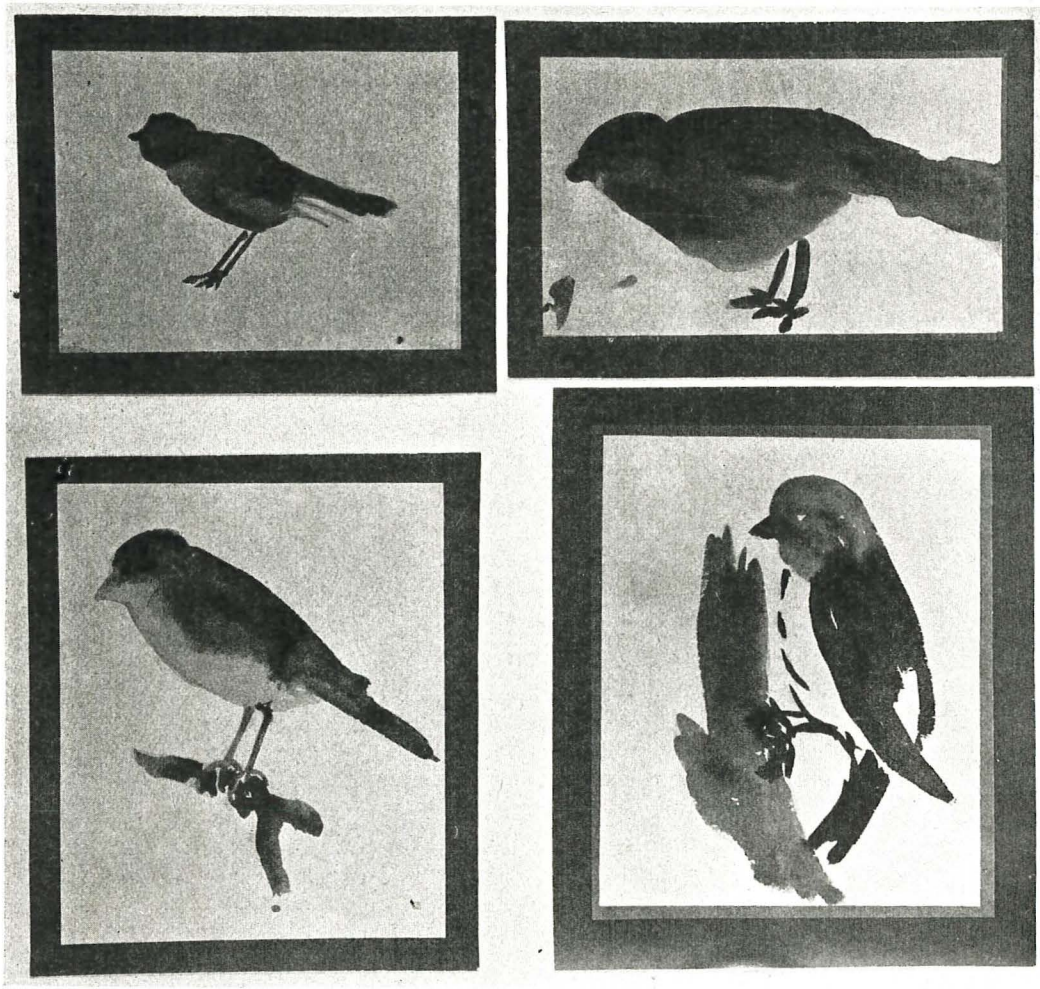


PLATE XXXVIII.

Top Row—Figs. 1 and 2. Bottom Row—Figs. 3 and 4.

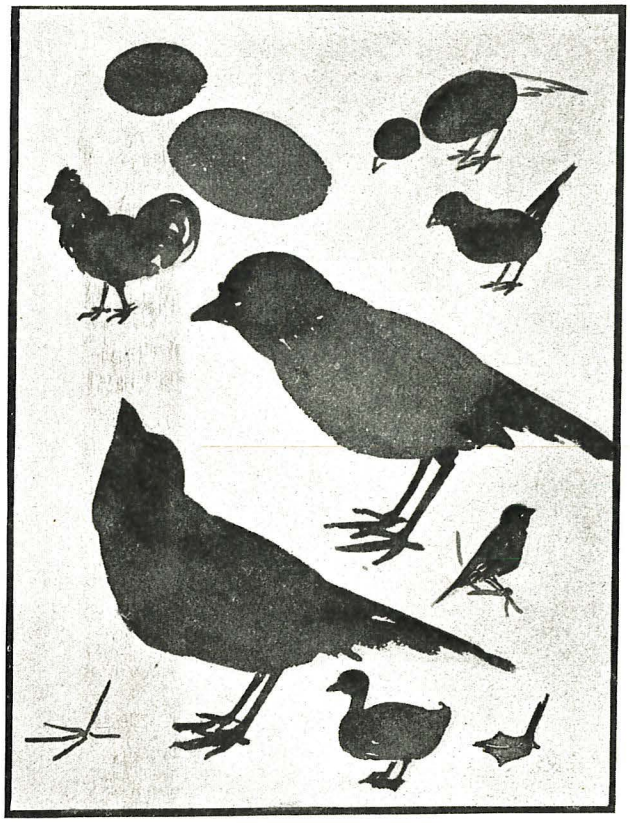


PLATE XXXVII.

eliminating the many intricate variations to be found in each individual spot. Do not neglect development of action because it is this phase of the work that will keep children interested.

Children are of a practical turn of mind. They admire that which does its work well. We may take advantage of these facts when working with birds and thereby induce our young people to put a great deal of accuracy into what is being done. Nine times out of ten primary children will attach the legs to the body of the bird at what seems to be the center. To their minds this appears the most sensible place for the attachment. If we suggest that the bird is better able to spring, hop, and jump if the attachment is made far to the rear of the body, children will recognize the practical side of the suggestion, remember the point and make an effort to carry it into execution. If we tell about the uses of the bird's foot, and the necessity of proper construction so that it may do its work children will make a determined effort to produce a foot that will work. And so we might tell why the bird holds its head in a nearly vertical position after it takes water in its bill, why it must have a serviceable tail of good proportions, etc. All these suggestions will help fix in the minds of the children the necessity of good construction.

The underlying form in the bird shape is the oval, and the placing of the large oval of the body and the smaller oval of the head, determines the action expressed. These ovals are brought together by adding the neck. The bill, legs and tail are additions which are easily placed when the body and head positions are correct. Plate XXXVII illustrates the development suggested in this paragraph. It also gives an idea of the construction and placing of legs and feet. Notice the variety in action obtained by changing the positions of the basic ovals.

When working in color it is well to begin with some bird in which the spotting is very simple, such as the robin or bluebird. The robin is practically made up of two colors—the grayish brown along the upper portion of the head and back and continuing out into the tail, and the red orange of the breast. The ovals should first be painted in, in the lightest color, in this case the breast color—and the darker color worked into these while they are still moist. Always have the colors mixed in the brush and on the paper. The lower part of the head and the breast may be brought together with the proper color. The tail may be carried out from the body part with free brush strokes. The bill, legs and feet should be done with the pointed brush. An enlarged drawing of a bird's foot on the blackboard will serve as reference material and help greatly in producing the proper construction. It is unnecessary to try to put in the eye each time, but if children look for it and it seems wise to work for it, the shape may be taken out with the dried brush and then a small spot of dark color dropped in. Figs. 1 and 2, Plate XXXVIII, show reproductions of first-grade work on the robin. Figs. 3 and 4, Plate XXXVIII, show what a third-grade class did with the bluebird and the red-headed woodpecker.

Plate XXXIX illustrates a scheme for fixing action positions in bird forms. Fig. 1 shows the dif-

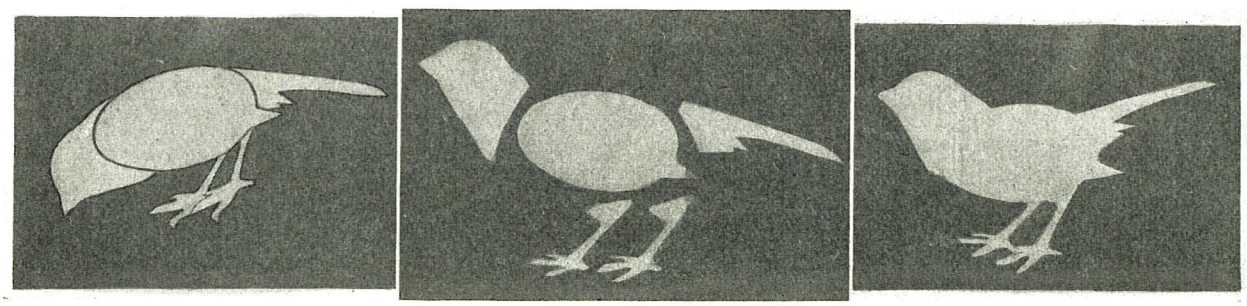


Fig. 2. PLATE XXXIX. Fig. 1. Fig. 3

ferent sections that are used in producing these poses. Patterns for these may be cut from good weight manila board by upper grade children. Primary children may trace around these, cutting out enough to make several birds in different positions. Much experimenting in laying may be done, fixing the relative positions of head, body, tail, etc., in the minds of children. Handling these shapes will help familiarize the children with the shapes of the different parts of the bird's body so that when painting is taken up there is some foundation for the work. simplest form—the dark of the back and the light of the breast. The shape of the dark should be very carefully studied and painted in with good free brush strokes. Then the shape of the light may be put in the same way, leaving a very narrow thread-like line between the two spots. Other color may be added to these spots, while they are still wet. The first few trials in this method will suggest stiffness and lifelessness. To remedy this children should be encouraged to try to approach the rounded shape produced when the ovals were used. Each of these

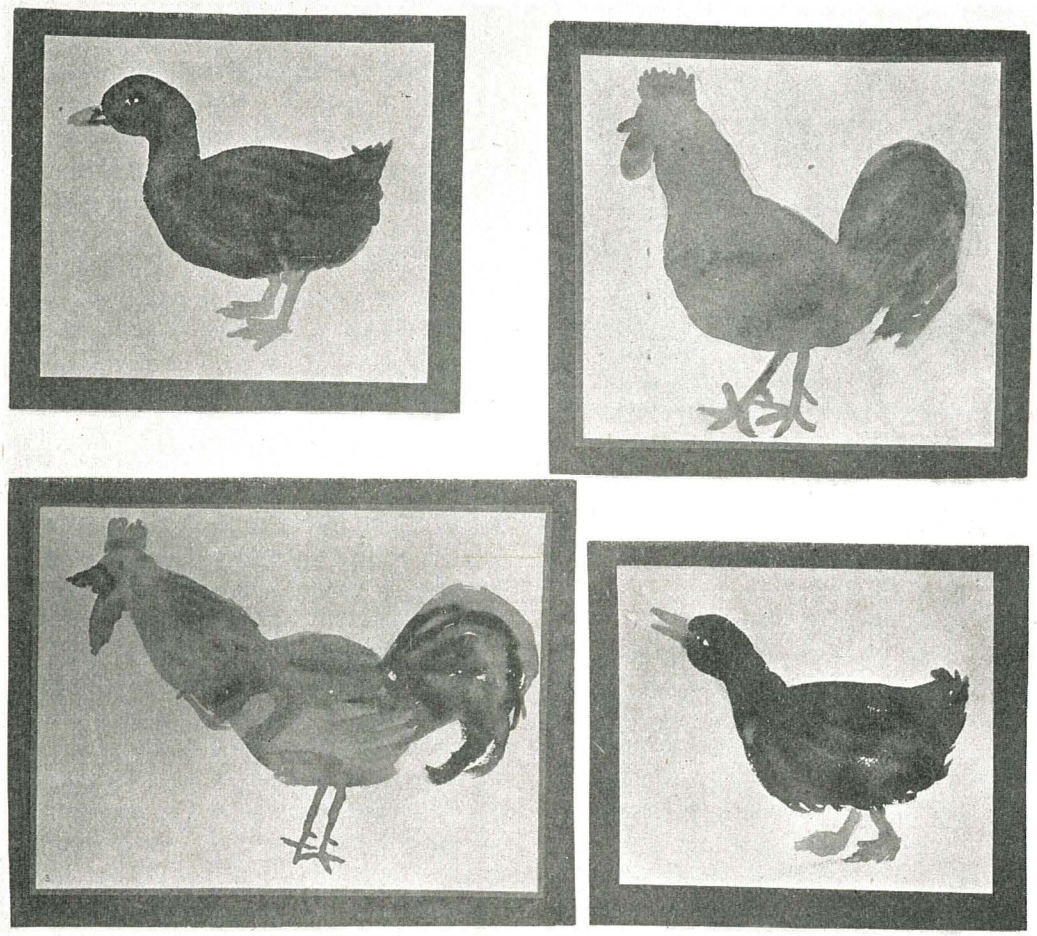


PLATE XL.

Figs. 2 and 3 show some of the results of this work. After the children have gotten the good out of laying the parts, they may be pasted as shown.

The method of painting birds previously suggested will do much for the development of good free work. The results will show much life and action and the shapes will be found to be remarkably true to type. The color, however, may suffer a little because of a lack of ability in young children to keep the color spots in shape. After enough work has been done to familiarize the children with action, shape, and color spotting a different method may be pursued. In studying the robin, its color spotting should be carefully studied and be reduced to its methods has something in it which the other will not supply, so it seems wise to employ both.

Besides the birds of the forest and field we find much good material for free color work among the fowls of the barn yard. The brightly feathered rooster furnishes a most attractive model and one simple enough in color spotting for young children. If possible have a rooster such as is suggested in the accompanying illustrations brought into the room. Of course, a rooster of the White or Barred Plymouth Rock varieties is of no use for color work. Those of glossy red, blue, green, and purple plumage will serve the purpose much better. A box, with the front and top removed, and these parts covered with

wire netting will keep the rooster in place while the children work.

If you are not fortunate enough to be able to secure a real, live rooster, a pretty good substitute may be found among the toys made for children. Sometimes, fairly good ones are to be found in the five-and-ten-cent stores. If several of these are placed about the room children will be able to do more individual work.

Plate XL shows the results of the attempts of young children to paint ducks and roosters.

Remember, always, that most good is to be obtained from this work when children enjoy it. Aim to keep your people interested and happy thru the choice of attractive models, simple enough for the children with whom you are working. Strive for good free execution, for only thru that kind of work will you be able to secure good results.

LITTLE ARGUMENTS ON GREAT QUESTIONS

Mr. Try Square Tries to Square Himself and Mr. Frills Gives Advice

"Very glad to meet you again, Mr. Frills. It has been a long year since we have exchanged confidences, yet you look even younger. How do you do it?"

"Do it!" echoed Frills. "When will you learn, Mr. Try Square, that worry is a confession of weakness. I am sorry to see you looking so, what shall I call it, 'mature?' Have you lost your job?"

"Oh, no!" replied Try Square with a sigh. "Quite the reverse. Yes. I am more mature than I was a year ago. I have been matured by discipline from without, rather than by the spirit from within. I have even reached the point where I do not object to that detestable name 'professor', tho I always wonder when my friends use it, which of my professions they refer to."

"Have you changed your methods, then, with every suggestion offered by your critics?" asked Frills, artlessly.

"No, not so much that," replied Try Square. "I have added a profession with each change of critics. When we met last year, Mr. Frills, I was an honest, earnest teacher of manual training. To be sure, I had but ninety minutes a week with each of my classes but we did a lot of good work in a short time, and my boys and I enjoyed every minute of it.

"Our troubles began when the principal of our school discovered that our work lacked what he called 'educational value and content.' We revised the course, and under the revision I lectured the educational value and content into the boys.

"We stood it pretty well until the athletic director left and I was asked to take his work. Then the school board appointed me purchasing agent and inspector of buildings in addition to my other duties.

"The new superintendent proved to be a great economist and insisted that in order to make the manual training practical, we should build some new furniture for his office and keep old things about the school in repair.

"Finally when the new vocational law was passed a night school was organized and I was asked to teach a few trade classes."

"But you surely get a handsome salary now, Mr. Try Square, with all these new duties," said Frills.

"Well! The board did raise me ten per cent," confessed Try Square, "but the landlady raised my board to meet it."

"And yet!" said Mr. Frills complacently, "I insist that worry is a sign of weakness. What you need is executive ability. Do you remember, Try Square, how you once charged me with teaching 'everything in the name of art'? If I were in your place I should organize and contend for a new name which would include all of your activities under one department. Then I should demand a title as head of that department. How would *Professor of Industrial Arts do?*"

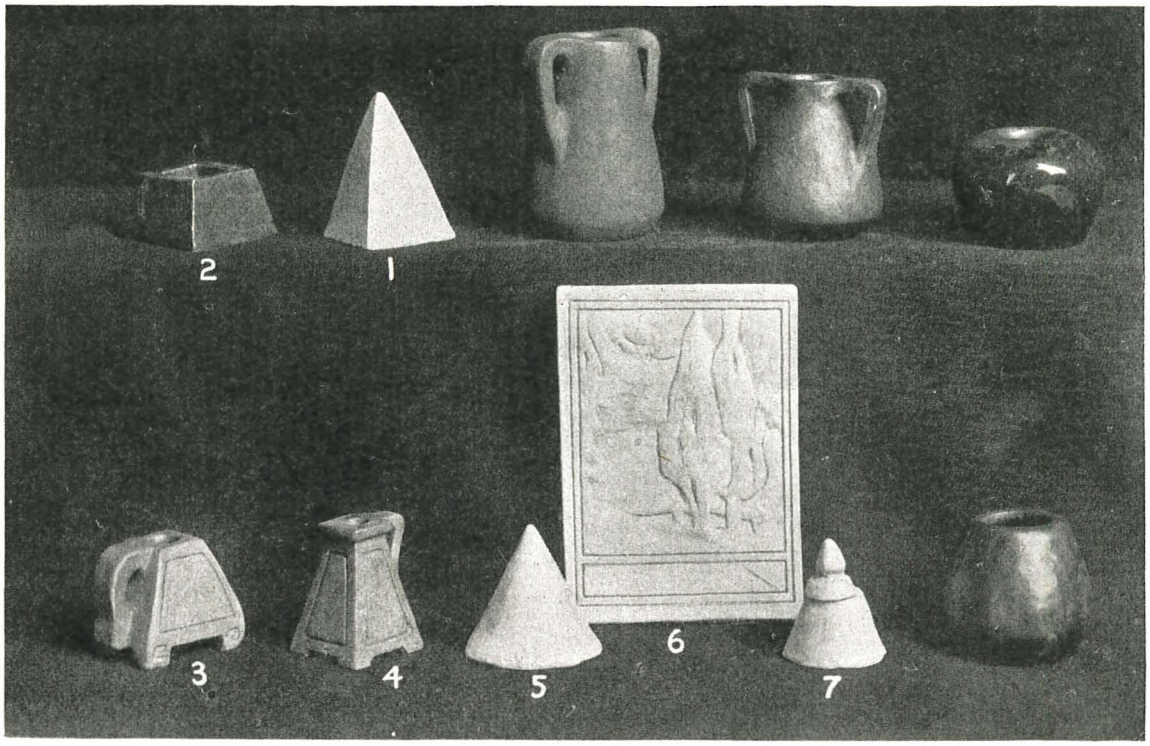


PLATE I.

DRAWING IN CLAY

Third Article

Mrs. C. F. Niles, Stout Institute, Menomonie, Wis.

PYRAMID PROBLEMS.

ALL thru the grades when the story telling and picture study unites with the history lessons on Egypt, a common shaped problem can be used for all, that of the Pyramid. Plate I, No. 1. Little fingers as well as maturer minds, will seek expression in drawing and shaping in clay. In the pyramidal case forms or match boxes illustrated in Plates I, II, III, the same thought is expressed as in obelisk, pyramid or church spire, which occurs so frequently in historic architecture.

It is our purpose to deal with this problem in the lower grades in the round. In advanced work the student may seek expression in low relief, modeling the many beautiful examples which are found in historic ornament.

Problem I.

Lesson I.

Build a pyramid the base of which is three by three inches and four inches in height as represented in Plate IV, No. 1. One inch from the top cut off the apex of the pyramid. Piece by piece hollow out the inside, allowing the walls to be three-eighths of one inch in thickness, forming an ink-well or match-box. The piece cut off can be used for a cover. The method of cutting out the inside has been explained in a preceding article.

Further problems may be given, such as candlesticks, shown in Plate I, Nos. 3 and 4; Plate V, No. 1, and book-ends to be ornamented by a line design or surface pattern. If a line design is used, an insect unit will make an interesting motif to decorate the sides as in Plate IV, No. 2.

Method of making the book-ends: Build a pyramid the base of which is six inches square. Locate the center, by drawing a line from corner to corner as in

PLATE II.

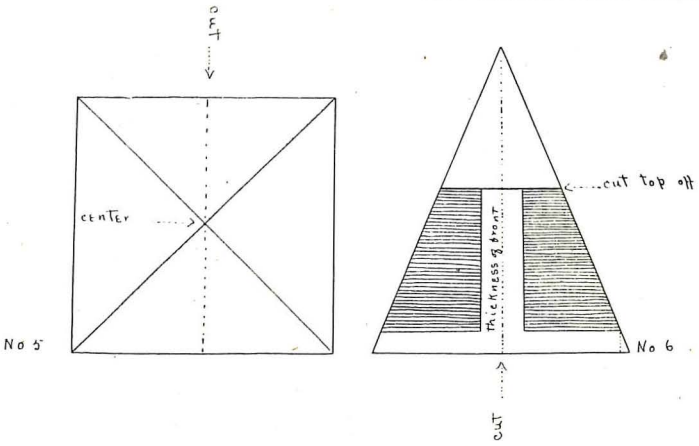


Plate IV.

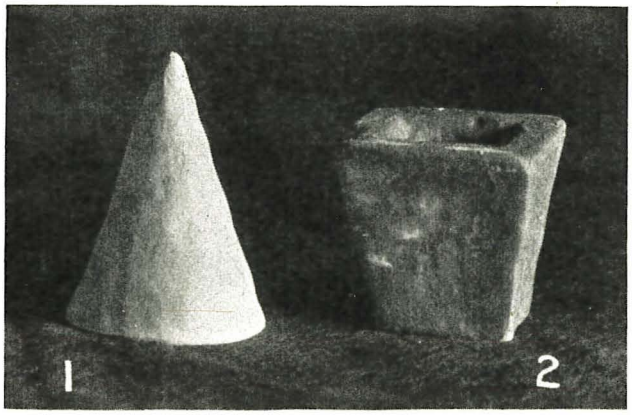


Plate III.

Plate IV, No. 5. At the intersecting lines cut with a thread to the top of the pyramid as in Plate IV, No. 6. Cut off the top of pyramid as in Plate IV, Nos. 1 and 6. Take one-half of the pyramid, selecting for the front view, the vertical section as in Plate IV, No. 2. Allow one-half inch for the thickness of the face and one-half inch for the width of the bracket at the back. With a sharp tool cut away the remainder of the clay. The colored portion in Plate IV, No. 6, is the part to be cut away. Follow directions in preceding articles for cutting away the surplus clay.

Another method of making book-ends would be to build each member and unite them as in the directions for a fern dish, given in a previous article. The whole field of pottery opens for forms built by these methods. Closely associated with these methods and in logical sequence to them are the problems related to the cone. Insofar as possible we omit the type forms, as such, and substitute the nature forms related to them, thus bringing the children in closer touch with nature, and the beauties of the commonplace.

Sea shells and tap-roots are modeled in the round, and followed by lessons from memory. For low relief modeling the Lombardy poplar tree is the staccato note of the landscape in Plate I, No. 6, and the pale green tapering tamarack that rears its slender branches above the mire, as in Plate V, No. 2, is interesting and suitable. These and many more forms are useful subjects for the imagination of the growing child.

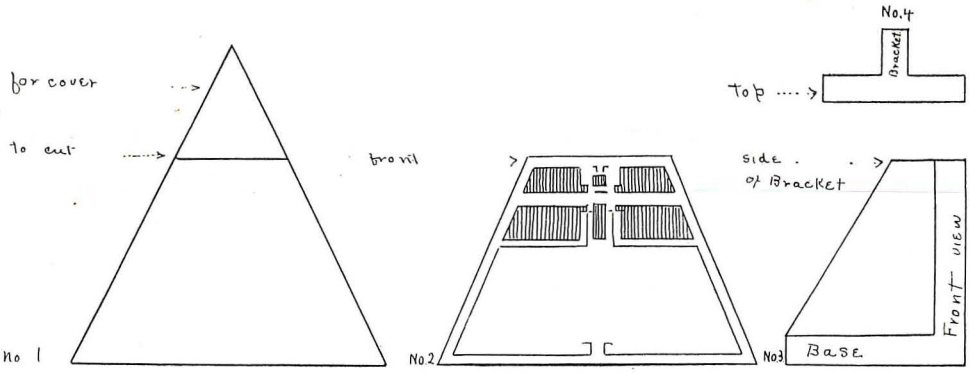


Plate IV.

An Indian Wigwam.

In this class of problems none delighted the children more than the wigwam shown in Plate VI, Nos. 1 and 2. The problem as assigned gave full play to the creative powers. Make a wigwam and place it in its natural surroundings. Roll out a piece

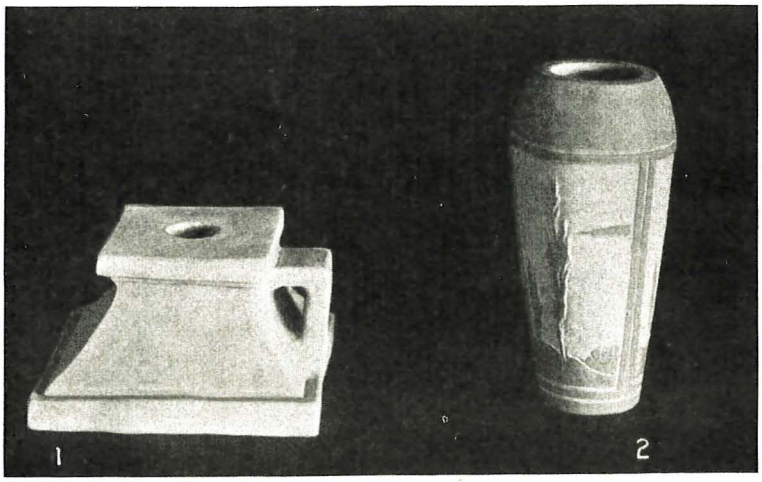


Plate V.

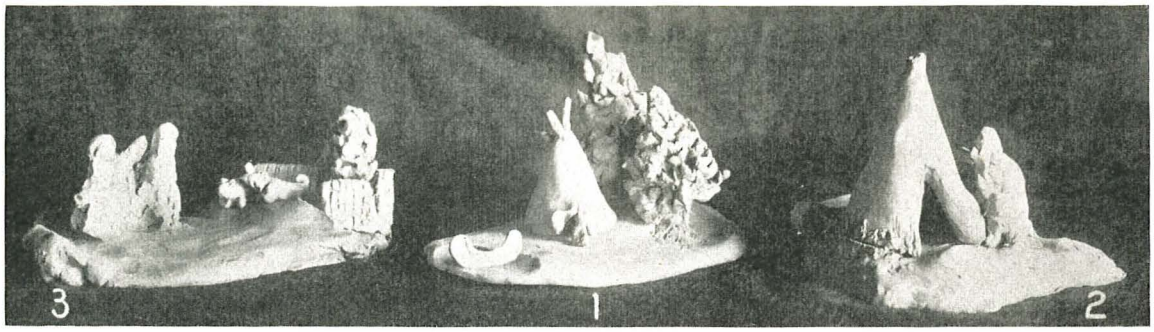


PLATE VI.

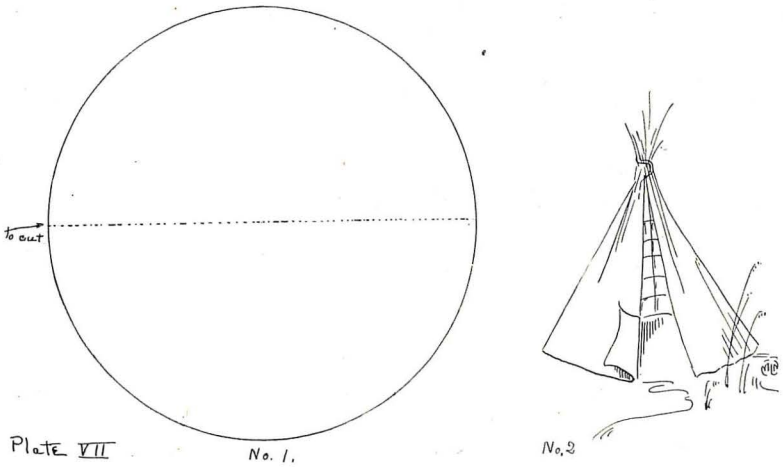


Plate VII.

of clay into a thin sheet or on a piece of paper flatten out a thin sheet of clay, forming a circular piece about the size of an ordinary griddle-cake and about as thick. Cut in half as shown in Plate VII, No. 1. About half of a circle forms a good shaped wigwam. Lift one-half of the clay shape into a cone, and lace down part way, leaving an opening at the base to admit the chief, for this is the home of one of our western Indians, who sits outside his tent invoking the spirit of peace and plenty. Flatten out another piece of clay for the hillside or river bank; then fasten the tent to this by means of pegs. Trees and a canoe may add to the natural setting, while a dog and a pony will give life and interest. A camp-fire and kettle will be the finishing touch.

Many kinds of industries trace their origin to the door of the ancient tent-maker. Varied were the signs and symbols traced on tents and crude pottery and woven into basket and blanket of our American Indian. Problems of varied interest can also be found in the adaptation of the cylinder to the columns found in architecture, to round towers, and the plant forms, to tree trunks and cat-tails.

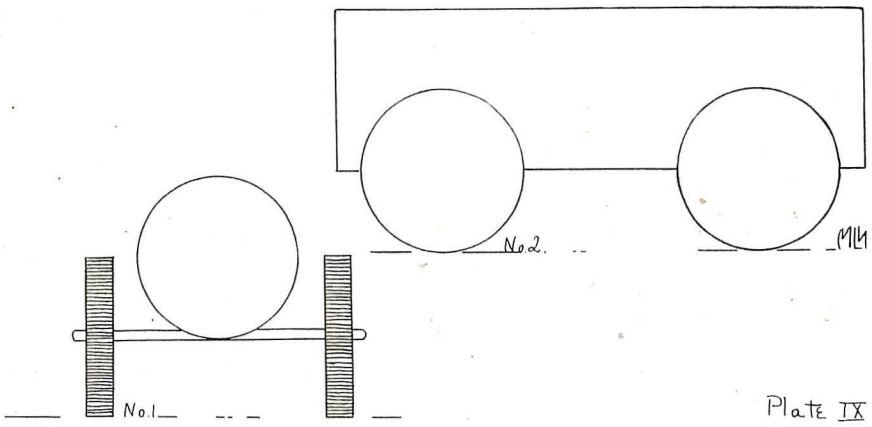


Plate IX.

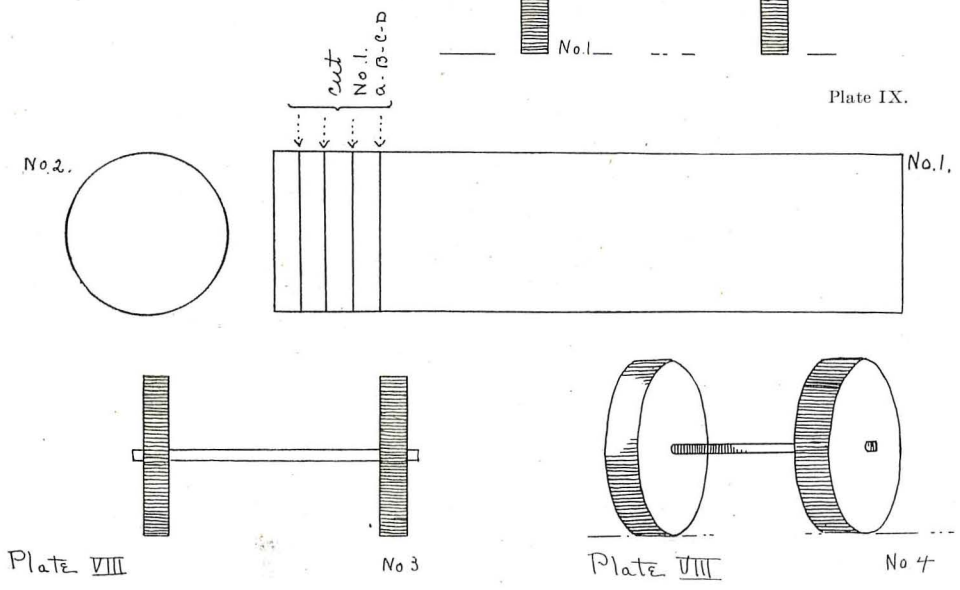


Plate VIII.

Locomotive.

Roll a perfect cylinder, six inches long and one and one-half inches in diameter, Plate VIII.

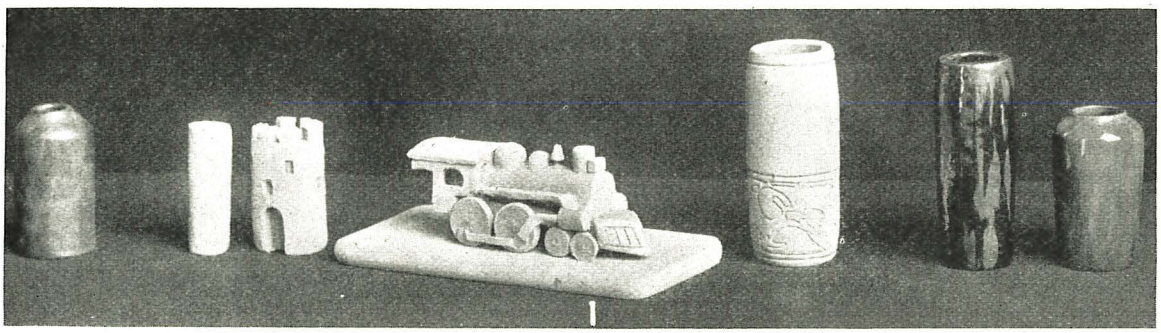


PLATE X.

With a thread cut off four sections, one-fourth of an inch wide, No. 1, A-B-C-D. From these pieces four wheels are made, Nos. 2 and 3. No. 4 is an oblique view of the wheels. Use a wood tooth pick for the axle of the wheels. The remainder of the cylinder is mounted upon the four wheels, Plate IX, No. 1, end view; No. 2, side view. The necessary trimmings are to be added to complete the locomotive as shown in Plate X. This model is loaned by the courtesy of Charles E. Eslinger of Stout Institute.

Plates II and V are models made in the clay modeling classes at the Stout Institute Summer School under the writer's direction.

BRINGING REAL LIFE TO SCHOOL

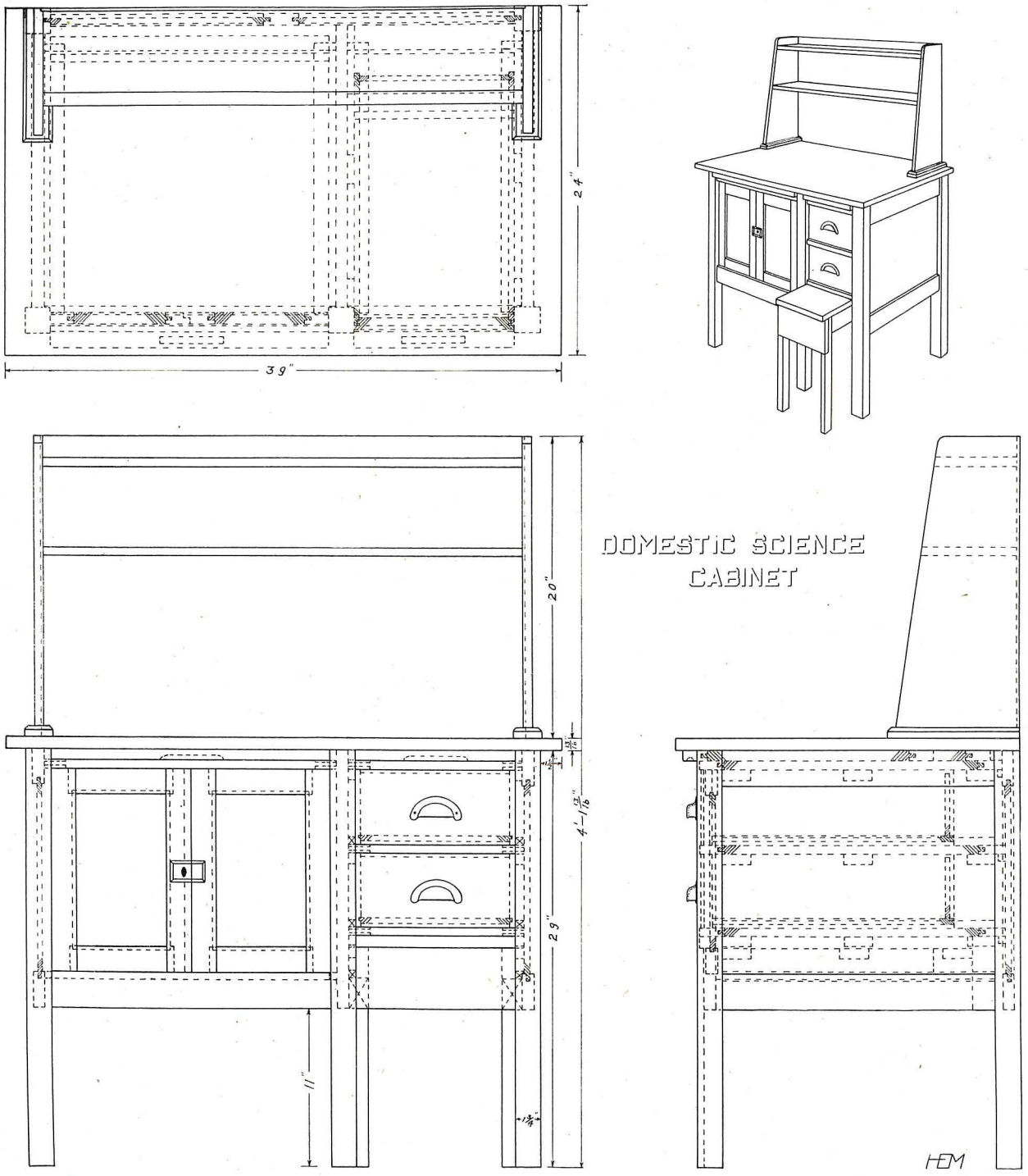
Pedr Price

ONE of our well-known educational philosophers has remarked that the greatest defect in modern education consists in its neglect of the simple every-day ways of doing things. It may be that he was thinking of school furniture when he made this observation.

The school kitchen offers a good illustration. Possibly you have visited one recently. If so, tell me honestly, could you match its equipment anywhere outside of school walls? You may have seen one of those hollow-square, store-counter affairs: drawers and cupboards below and a four-track elevated at the back with bunsen burners to heat the rails. Perhaps you saw a group of flat-top desks with the bunsen burners where the pen trays ought to be. Somewhat different they were at any rate from the home kitchen where the girl is expected to practice the fine art of cooking.

Not long ago a domestic science supervisor was telling me of some new schoolrooms that she must equip for cooking. My first query was, "Are kitchen

KITCHEN CABINETS IN ACTUAL USE.



WORKING DRAWING OF DOMESTIC SCIENCE CABINET.

cabinets good things?" "They certainly are," was her reply; "every home ought to have one." "Then why not use them in school kitchens?" I asked. "Why not?—why—why not?" She was convinced and away she went with her problem to the teacher of manual training. "Could your boys make fifteen "baby grand" kitchen cabinets, like the real ones, only smaller and more simple, with cupboards in the lower part and shelves above for flour, sugar and spices?" He thought that they could. Together they worked out the project. In three months the sixteen cabinets were completed and put in place—a cabinet for each girl and a stove like mother's. Supply cupboards were placed at one side of the room; ordinary sinks and a refrigerator at the other.

With some misgivings the newly appointed teacher was ushered into this new kitchen. At the end of a month she was interviewed. "Do you like this style of equipment and do you find it convenient?" she was asked. "Yes, it was splendid. The girls did like their own little kitchens. They were conducting a lunch room for 40 teachers and 300 pupils and were taking orders for baked goods outside." Real life has been brought to school.

The Making of a Book in an Applied Arts Course

Alma C. Field, Providence, R. I., and Lillian R. Field, West Warwick, R. I.

TO help make more practical the applied design course this project of a leather backed book sewn over cords was used in the high school. The many and varied opportunities for applying the principles of design, the necessity for thought and originality on the part of the pupil, the little equipment required and its appeal to boys and girls alike, make it an ideal problem.

Materials—Paper for pages
- Drawing paper
- Wrapping paper
- Typewriting paper
- Cardboard (less than 1/16″ thick)
- Cover paper (various colors)
- No. 5 needles
- Linen thread
- Cheese cloth
- Headbanding
- Leather of various colors
  - Sheepskin
  - Calfskin
- Blockprinting materials
- Paste (boiled flour paste)

The use for which the book is intended should be first talked over and decided upon by the pupil. A few of the popular titles used in our class were My Diary, School Notes, Tales of Camp Fire Girls, Books I Have Read, Flowers, Birds, etc., thus correlating with other branches of the course of study.

Next the size and proportion of the pages are planned. Several sketches of varied proportions

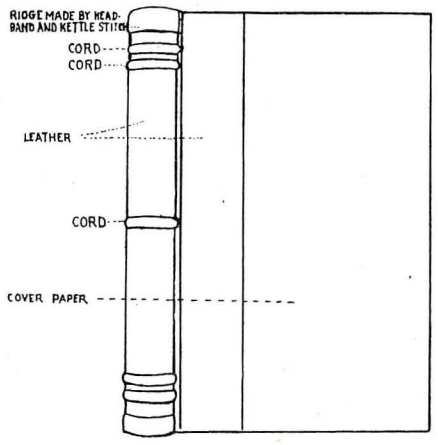


FIG I

are made and discussed as to their merit. Finally the deduction is reached that rectangles having ratios different for the eye to detect are the most pleasing such as 5:8, 7:10, etc., while others are monotonous by their lack of variety as 1:2, 1:1½.

After the size and shape is decided upon it is then time to make the structural design for the cover and backing. Sketches like Fig. I are made and the most pleasing kept for future reference. Here the pupil must decide upon the number and placing of the cords and kettle stitches and arrange them with good space divisions. He must select his leather, cover paper, paper for pages and end sheets so as to obtain a good color harmony. The book is now ready to be made.

Fold the pages for the book folio, quarto, or any number of times according to the size of the sheet. The number of sections or signatures will depend upon the thickness of the book.

While the signatures are pressing, the end papers may be made. The decorating of these pages by the process of blockprinting forms another problem in design. There should now be a demonstration of the method of blockprinting in which wood, linoleum, sweet potato and white potato blocks are used, making several prints, and following this a class discussion as to the kind of design suitable for the purpose and process. The pupils find that a simple all-over pattern in keeping with the rest of the book is desirable.

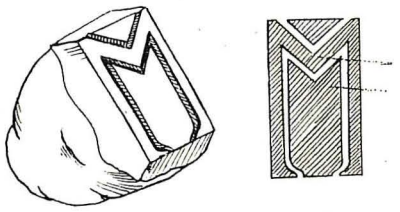
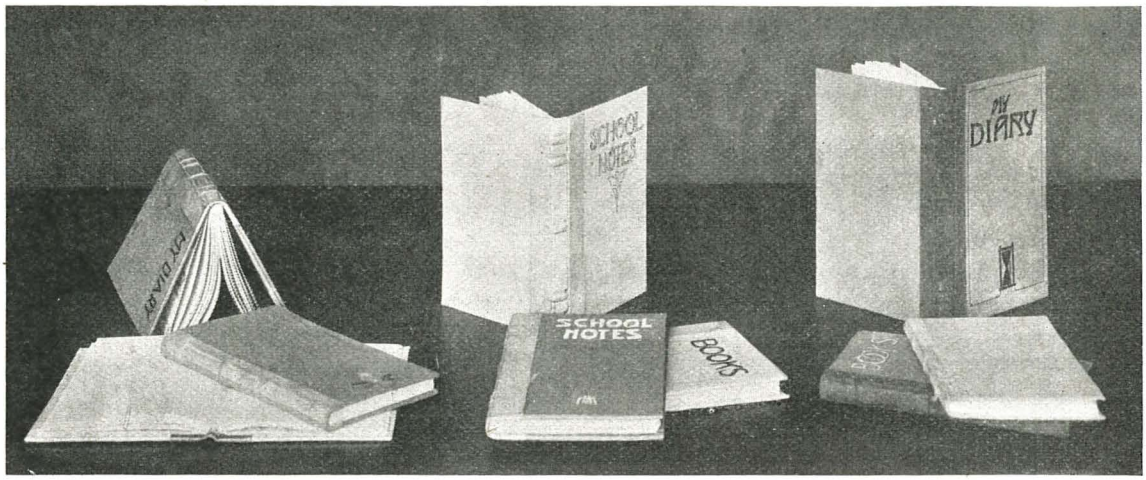


FIG. II

Each pupil must then work out his own blockprint. Monograms and initials were favorite units for diaries, altho other motives suggesting the use of the book were just as pleasing.

The school equipment will, to a great extent, decide the materials used for the blockprinting. Wood blocks cut out with a gouge and printed with oil paints are, of course, the most desirable, but we found that highly satisfactory results could be obtained by the use of a potato block (Fig. II) and school water colors, a little paste being added to keep the water color from spreading. A piece of flannel of two or three thicknesses saturated with the water color mixture and placed on a flat surface makes an excellent pad to which the block is applied. The potato block is very easily cut but it is perishable and must be used the same day that it is cut.

After experimenting with various repeats of the unit the best arrangement is selected, the end sheets are laid on blotting paper and carefully printed. These end sheets should be large enough to allow



Books made by Sophomores at West Warwick High School, Rhode Island.

for trimming down to the exact size of a double page. When dry, fold, trim and lay aside until book is sewn. If the signatures of the book are made of light weight paper the end sheets should be heavier.

The book is now ready for sewing. Mark off on the back of the signatures, the places for the kettle stitches and cords. Mark thru each section

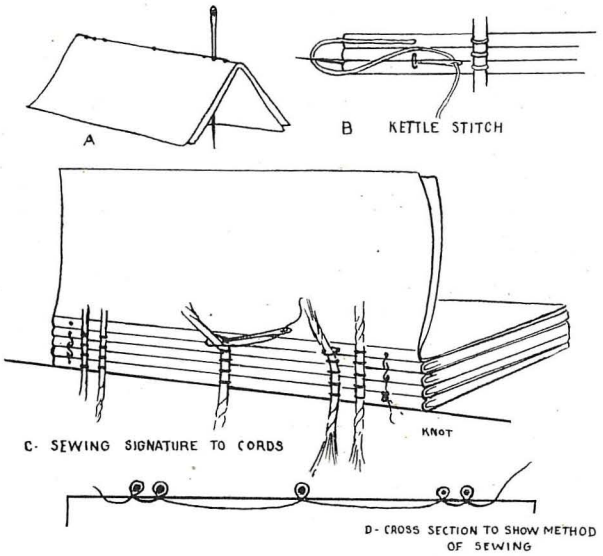


FIG III

by piercing with a needle. (Fig. IIIA.) Sew the signatures over cords as shown in (Fig III, C and D), using the kettle stitch at the top and bottom. Pull the stitches as tight as possible without tearing.

When sewn, the ends of the cord should be cut to within about two inches from the book on each side, and the free portions frayed out.

Draw a line $\frac{1}{8}''$ from the folded edges of the completed end sheets. Cover this $\frac{1}{8}''$ space with paste and attach to the front and back of the book. Be very careful not to get the printing upside down.

While one pupil holds the back of the book so that the sections are pressed as closely as possible, another pupil can pull the cords straight and tight with a little twist if necessary. Glue or paste is then laid over the back and rubbed in.

The headbands are then attached at the top and bottom and a strip of cheesecloth 1″ shorter than the length of the book and 2″ wider than the thickness of the book is pasted to the back and fitted snugly around the cords. A pair of pliers will help greatly here.

While this is drying cut the four cover boards, two for the front and two for the back. Allow 3/16″ or more between the back of the book and the edge of the boards for the hinge. Have the boards extend $\frac{1}{8}''$ beyond the pages at the top, front and bottom.

Slip the frayed cords and the cheesecloth between the boards and paste securely together. Place under

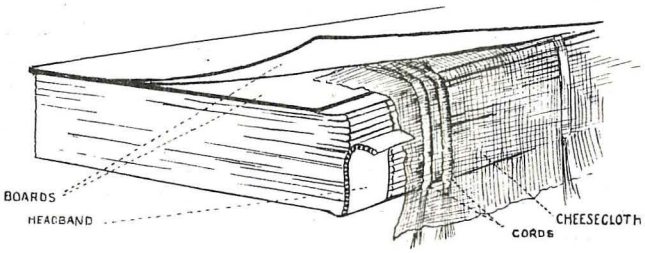


FIG IV

pressure all but the back of the book and let dry. Fig. IV.

Cut a strip of leather $1\frac{1}{2}''$ longer than the length of the cardboards and as wide as the thickness of the book plus twice the width of the leather planned to show on the front cover, as illustrated in Fig. I.

Wet the leather, cover the wrong side with paste (equal parts of paste and glue is best) and attach to the back and cover boards, modeling over the cords. Pull back the covers and turn in the extra leather at the top and bottom, even with the edge of the covers. With the back of the scissors make a groove along the hinge. Then the book is ready to be tied, as illustrated in Fig. V, and laid aside to dry.

Meanwhile cut the cover paper, allowing $\frac{3}{4}''$ at the top, bottom and front for laps. When the

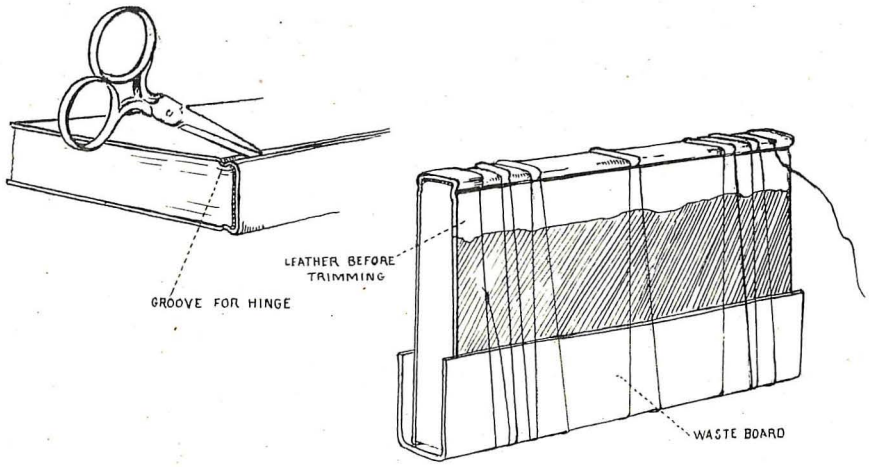


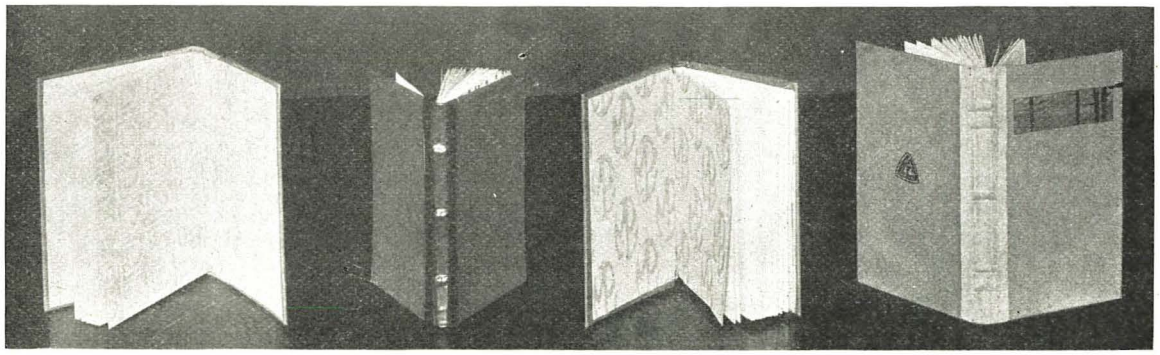
FIG V

book is dry untie it and trim off the leather with a ruler and a sharp knife, making the width correspond to the original plan. You will find that the leather has stretched considerably. If the cover paper is not as thick as the leather a filling paper must be pasted on the cardboard before the cover paper in order to bring them on a level. Paste the edges down firmly, mitering the corners. Press. Now the book is ready for the end papers to be pasted to the covers. Press again, the longer the better. Too much emphasis cannot be put on careful pressing thruout the problem.

The book itself is finished. By this time enthusiasm is at its height and the cover decorations will be worked out in the true spirit of the practical designer. While making the book each pupil took note of the various book covers he saw so that in the class discussion of good and bad covers there was plenty of material. The designs were executed with transparent and opaque water colors and Higgins' ink.

We regret that in the accompanying illustrations the many color schemes cannot be shown.

Apart from the art side the problem led to an intelligent interest in the processes involved in bookmaking and to a love and respect for books.



BOOKS DESIGNED AND MADE BY STUDENTS IN THE WEST WARWICK HIGH SCHOOL.

VENEERING AND INLAYING

A STUDY OF MATERIALS, PRINCIPLES AND PROCESSES

G. M. Nyman, Woodward High School, Cincinnati, O.

(Second Article)

Minimum of Equipment.

NO elaborate equipment is necessary and good results have been obtained on small articles, such as tray bottoms, fancy boxes, checker boards and picture frames in school shops where clamps were the only means of pressure, also using cold glue. In our shop we have successfully veneered stock up to 24″ by 36″, using ordinary handscrews, hot glue and heating our cauls on the steam radiator.

Constituents of Veneered Work.

Veneered work is usually found to consist of three or more layers, core, cross banding and face veneer. The core stock may be 3-16″ or any thickness suitable to the purpose. If thin, it is usually rotary-cut poplar or birch. If thick, any of the following woods are likely to be used in order mentioned: Chestnut, poplar, birch, soft pine, elm, or others prevalent in the locality.

Core Stock.

Good gluing and staying qualities are desirable in the core stock. All defects in same should be remedied—large holes plugged and smaller ones filled with a paste made of silex and thin glue (charcoal, chalk and thin glue also makes a good filler). The filler must be dry and is then tooth planed level with surface before veneering.

Cross Banding.

The cross banding (1-16″ rotary cut poplar or birch) serves a double purpose—that of stiffening the object, preventing it from warping and shrinking, and also forms a soft, even-grained surface for adherence of the face veneer.

Advantage of Good Blind Stock.

On highly polished furniture, where the face veneer is laid on coarser wood, one can often see every line in the grain of the underlying wood—the softer spring growth will shrink more than the later growth—knots, being harder than the surrounding wood, will stand out especially prominent. The cross banding will act as a medium preventing this, altho if veneered work is not given time to dry thoroly before being cleaned up and finished, it is likely to show it later on in spite of the cross banding. Many manufacturers glue a coarse cheesecloth under the face veneer, thus preventing the grain of the core wood showing thru and also giving better gluing surface. However, this is only done on fine work.

Joining and Taping of Veneers.

In case the cross banding or face veneer has to be joined, place veneers between two boards, held in place with a handscrew at each end, and fasten in bench vise for joining. Good veneer joints can be made with little effort by the use of a shooting board and a sharp jointer plane. The veneer is held flat on the board with a stick and joined. The pieces are then fastened on a board with small brads ($\frac{1}{2}$″ No. 20) so as to keep the joints tight and even while tape is glued on. For cross banding and thin core, use cheesecloth tape, for face veneer, paper tape. The cloth tape on the cross banding is merely to prevent the joints from slipping apart or lapping, and a short strip glued across the joint at each end will do the work. However, the leaving of a few patches of thin tape at intervals under the face veneer, if they are needed, does not affect the quality of the work.

On face veneers tape all joints the entire length, also tape all split places to prevent further rupture. In many cases ends as well are taped to insure safe handling. Cheesecloth and paper tape are on the market. The latter can be secured from any paper dealer, but the home-made article will serve all purposes. Use thin, tough paper cut in strips three-fourths to one inch wide.

Remedying Defects in Face Veneer.

On fancy veneers (walnut root and crotch mahogany) there are often found small defects—little chips missing or tiny holes. These can be filled with a paste made of scrapings of the same wood and very thin glue. Coloring matter can be added to give the filler any desired shade. Yellow ocher will be found to work well where a lighter shade is desired. This paste kept in a wide necked bottle and applied on the little defects before the veneer is laid will save subsequent labor. If the holes are of any size, pieces of veneer to match should be fitted in and bits of paper glued over.

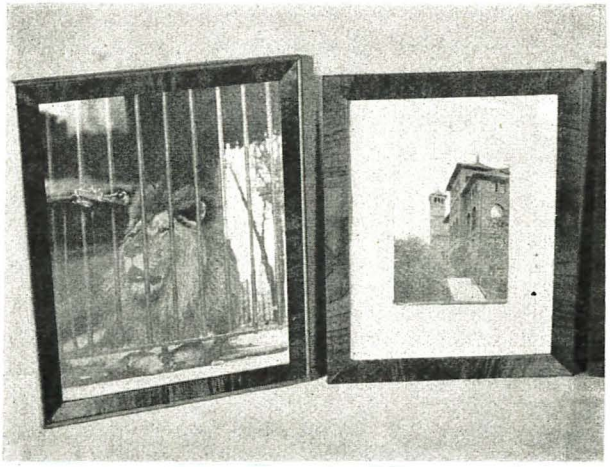
Cauls—Metal and Wood.

Among the important factors in veneering are the cauls—wooden boards or metal sheets as the case may be—used for reheating the congealed glue and keeping the same in a liquid state until pressure has been applied. Metal cauls (aluminum or zinc) are by all means the best and most economical. They should be thick enough to serve the purpose stated above, so that if it takes a long time to get the job under pressure, the metal will be thick enough to retain its heat for that length of time. One-sixteenth inch (1-16″) thickness is satisfactory for all-around flat work; curved work requires more flexible metal—24-gauge. The cauls in this case are backed up with wood and both metal and wood are heated. This is also done on flat work, when the metal is too thin to retain heat for the required length of time. The

sooner the caul cools, after pressure is applied, the better. A new batch can then be put into the press. Overheated cauls are detrimental to good work, as they cause undue expansion of the veneer and the absorption of glue into the wood, which, at times, leaves a starved joint. Keep cauls greased with tallow to prevent them sticking to the veneer. Wooden cauls are satisfactory when made of material that will stand repeated heating without warping. Chestnut, butternut and pine are such woods. In addition to greasing wooden cauls, it is well to place newspaper between them and the veneer.

The cauls should be of uniform thickness—about $\frac{3}{4}$ inch. This will allow two cauls to be placed side by side in case a larger surface is to be veneered. If there are facilities for heating the cauls, as many pieces can be veneered as the press or handscrews will hold. If the radiator has to be depended upon for heating of cauls, it is not advisable to veneer more than one piece at a time. Composition boards have been tried for cauls, but are not finding much favor, but three-ply panels about $\frac{3}{8}$ inch in thickness are used in many places.

Where band-sawed work is veneered, the waste pieces are used as cauls. This, of course, necessitates close band-sawing and, should this not be entirely successful, the bumps must be taken out of the piece to be veneered, as well as the waste part, and a thickness of felt placed between to equalize the pressure. The usual precautions should be taken to prevent the felt sticking to the veneer. Use a thin piece of zinc or paper. Such problems as the edges of round tables are invariably veneered by having a metal band drawn tightly around. This band is a little shorter than the circumference of object to allow for clamping. When everything is ready and the veneer is in place, the band (now warm) is drawn up tightly.



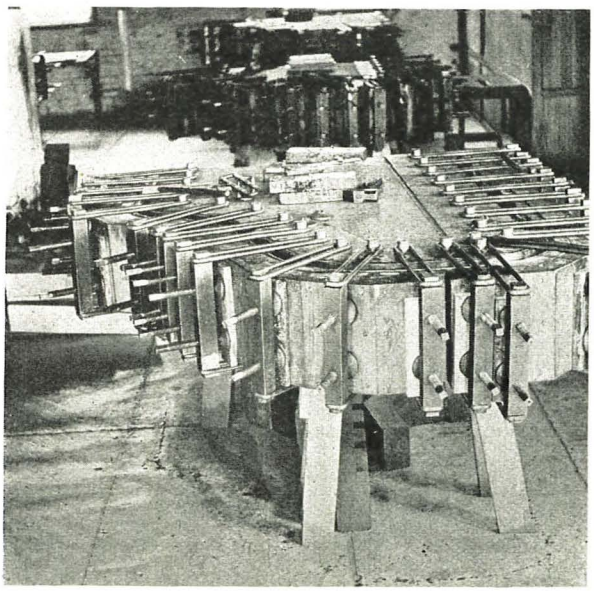
Veneered Picture Frames.

That part between blocks not pressed down, is later on softened up with water and a hot flat iron, and then rubbed down with a veneer hammer.

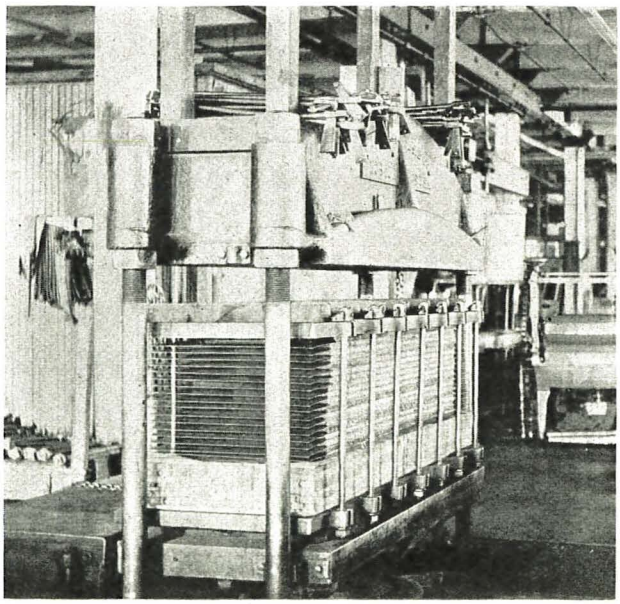
Table rails, or other one-piece circular objects, glued up of segments, are not hard to veneer if the work is gone about in the right way In many cases the segments glued up are wide enough to allow $\frac{1}{2}$ inch to $\frac{3}{4}$ inch to be cut away when trimmed to size. This waste part is used for caul. A board, thin enough to bend to the desired curve without breaking, can also be used for the same purpose. In either case the cauls must be heated and handscrews applied 4 inches to 6 inches apart, beginning at one point, going around and ending up at starting point.

Glue.

Glue used for veneering should be thicker than that used for ordinary jointing. The proportion of glue to water depends largely on the quality of glue—the better grades of glue will stand more water and give more glue of a given consistency, pound for



Curved Rail for "Grand Piano" in Veneer Press.



Hydraulic Veneer Press. Batch ready to take out.

pound, than the cheaper grades, thus proving really more economical, besides giving better all-round satisfaction.

A veneer joint is not different from any other glue joint, except that the glue is spread over a larger surface and the veneer, being thin and easily affected by heat and moisture accompanying the gluing process, requires careful handling.

The consistency of the glue used in jointing should, to a large extent, depend upon the absorbing qualities and texture of the wood used. It should be thin enough to flow readily into all cells and ducts in the surface of members forming the joint, yet it should be of such a consistency that, when dry, it leaves sufficient solid glue matter to connect the cells of one member with those of the other, thus dovetailing them together and forming a union that cannot be broken without rupturing the cell walls.

Glue size is glue thinned with water until the presence of glue is hardly perceptible, when run from brush, between fingers. It is used preparatory to the veneering of curved work having more or less end grain and on very soft core stock, where the veneer glue is likely to be absorved, thus leaving the joint without the proper binding substance.

Things to Consider in Order to Obtain Good Results.

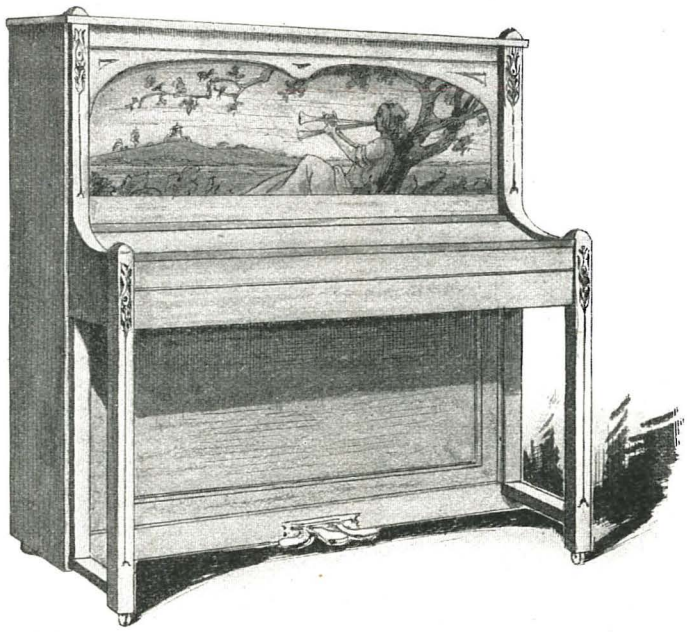
Good results in veneering can be obtained by following these suggestions: Use glue of proper consistency; have the cauls just warm enough to do the work intended and get the batch under pressure with the least expansion of veneers.

Good veneer work should be free from blisters and lumps—should have no minute checks, nor should it warp. The defects mentioned are hard to overcome after once created, but are easily prevented. Blisters may be caused by too thin glue, or not enough of the glue; by overheated cauls, or by a combination of all. Unevenly distributed pressure may cause blisters, so will a caul that is not warm enough to do the work. (See cauls.) The latter may also cause the surplus glue, not hot enough to be pressed out, to collect in some places under the veneer, thus forming high spots on the face veneer which, when leveled, will leave the veneer very thin—even running the danger of smoothing thru.

Hair-line checks are usually caused by undue expansion of the face veneer. This veneer, glued down and made part of the whole, has no chance to regain its former dimensions but the strain produced will cause the minute checks to occur. They are, in most cases, not visible before the piece has been finished and the damage done. The more expensive veneers are most likely to check—such as crotch mahogany, in which part of the grain runs almost perpendicular to the surface. This end grain will quickly absorb glue and expand, the strain in subsequent contraction causing little checks.

To prevent undue expansion, use rather thick glue and do not lay the veneer on the hot glue, but wait until the glue congeals. If necessary, help this chilling action with a fan. Have cauls moderately hot and do not veneer too many pieces at a time, thus avoiding delay in getting the batch under pressure.

Veneers are usually cut to extend about $\frac{1}{2}''$ outside the piece to be veneered. This is done to take care of possible sliding. If the veneer should be scant, a small brad fastened in the middle of each end and bent over will prevent sliding. However, if the pressure is put on gradually, first in the middle to press out any surplus glue and then all around, there is little danger of sliding. It will be necessary to tighten the same screws more than once to insure even pressure.



An Example of Elaborate Inlay. Courtesy J. Bernard Co., New York.

PRIMARY CONSTRUCTION

Edward F. Worst, Director of Elementary Manual Training and Construction Work, Chicago

APRIL.

Construction Work for First Grade.

It is difficult to determine which school month of the year is most interesting from the construction point of view. April brings with it all the Easter interests and not only this but also the construction of baskets to be used on "May Day."

Cutting and Tearing.

The freehand cutting and tearing for this month naturally centers around the Easter interests. Cut flowers for the May baskets and rabbits and chickens for Easter greetings.

Clay.

Model rabbits and chickens.

Easter Basket.

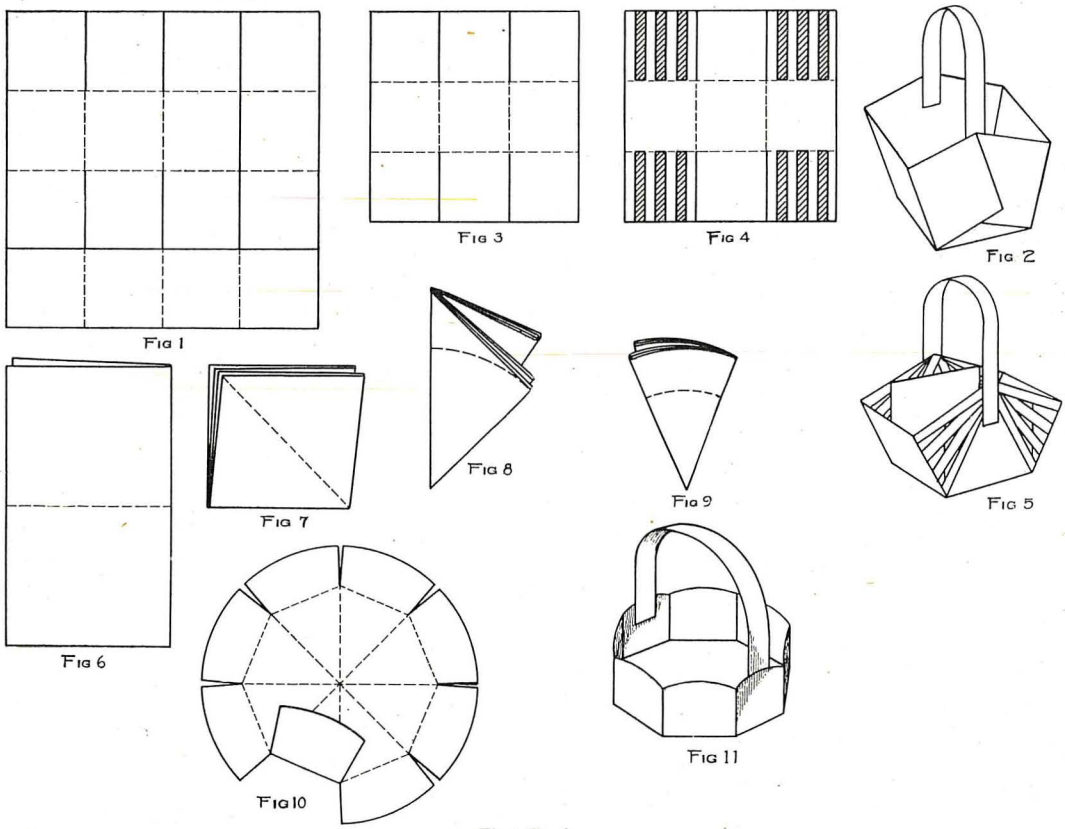
Pass to each beginning first-grade pupil a nine-inch square of tinted construction paper and fold into sixteen small squares as shown in Fig. 1. As the folding is being done, review the number work with the beginners as suggested in the folding of the box for shoe pegs in the September outline.

Cut on all continuous lines as shown in Fig. 1. Fold and paste into shape as shown in Fig. 2. Cut the handle freehand and paste as shown in Fig. 2.

Fig. 5 shows a modified form of the basket shown in Fig. 2 and is best constructed by the pupils of the advanced first grade. From a piece of 6″x9″ tinted construction paper cut a 6 inch square, and divide it into nine squares as shown in Fig. 3. This is not as difficult as it might seem, since no measurement is less than two inches.

It is always understood that all continuous lines are cut. Fig. 4 shows that each square in the four corners is cut into seven strips freehand; that is, the width of the strips are not measured. The strips are still all attached to the middle square. Cut away every other strip beginning with the second strip from the top or bottom. Fig. 4 indicates the ones to be cut away. The basket is now folded into shape, the free ends of the strips being allowed to overlap, and pasted to the center square at each side, Fig. 5.

The handle is cut freehand and pasted to the outside of the basket, thus covering the overlapped strips as shown in Fig. 5.



First Grade.

Easter Basket.

Pass to each pupil a 4″, 6″, or 8″ square of tinted construction paper. From this square a circle is to be cut. To do this fold first into halves, Fig. 6, then quarters, Fig. 7, and then eighths, Fig. 8.

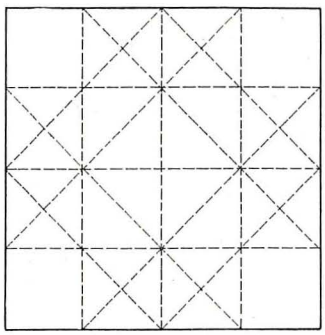


Fig 12

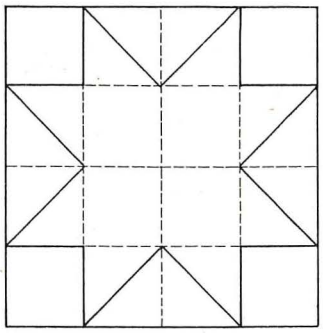


Fig 13

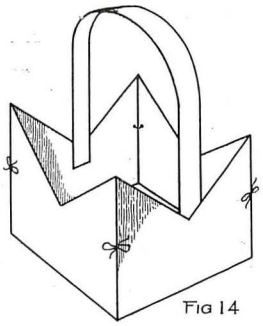


Fig 14

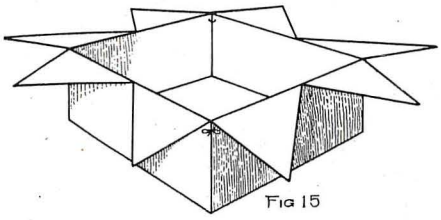


Fig 15

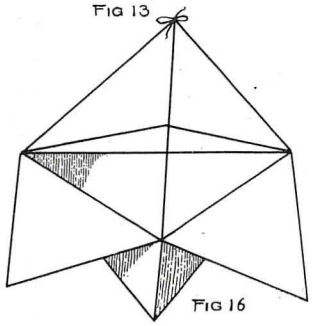


Fig 16

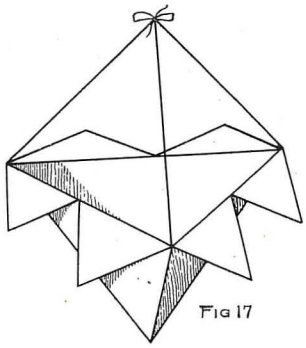


Fig 17

First Grade.

Cut as indicated by dotted lines, Fig. 8. Draw a curved line about one inch from outer edge as shown in Fig. 9. Before unfolding, cut along creases to the line just drawn. Unfold. Fold back each section of the folding, as far as the cuts will permit, Fig. 10. Tie or paste the edges together. Cut handle free-hand and paste in place, Fig. 11.

Easter Basket.

Fold a 9″ square into 16 small squares. Review the number work in this folding, as suggested in previous exercises. Fold each corner to the center, and then to the corner beyond the center. Fig. 12. Cut as indicated by continuous lines shown in Fig. 13. Paste or tie as shown in Fig. 14.

It will be observed that the creases indicate very definitely the lines to be cut. This may be a little confusing to the pupils at first, but if the teacher will work out the folding before giving it to the class more definite directions can be given.

If so desired the points may be turned outward as shown in Fig. 15.

Figs. 16 and 17 show other hanging baskets made from foldings. These were mentioned in the December outline to be used as Christmas tree decorations.

Any of the baskets made in December are quite suitable for May or Easter baskets.

It will be remembered that May baskets as well as the Easter baskets are made during this month.

Material: *Bird House.*

One sheet of 6″x9″ construction paper.

Purpose:

To interest the pupils in the care and feeding of birds.

Incidentally, to teach number, skill, and neatness.

Presentation:

After a general talk on the care and feeding of birds, present the finished bird house. Call attention to the slanting roof which is an advantage in shedding rain. The projection in front gives the bird a place to rest and makes it easy to enter. Call attention to the openings of bird houses. The size of the openings depends upon the kind of bird that is expected to live in the house. Tell about some birds driving other birds away if the opening to the house is large enough to admit all sizes of birds.

Pass to each child a 6″x9″ piece of construction paper. Place the ruler along the long edges of the paper and place dots 4 inches from the short edge. Connect dots by a straight line and cut on same.

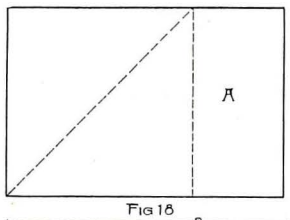


Fig 18


Fig 19

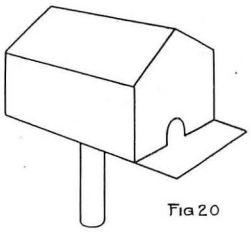


Fig 20

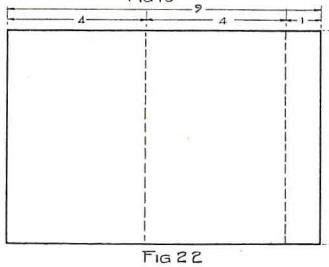


Fig 22

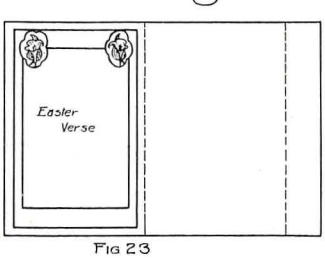


Fig 23

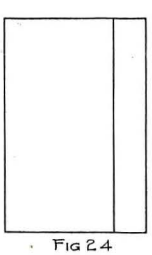


Fig 24

First Grade.

We now have a rectangle 4″x6″. How much longer is the rectangle than it is wide? What is the length of the two short edges together? What is the length of the two long edges together? What is the length of one short edge and one long edge together? How many inches around the rectangle?

To construct the birdhouse fold one short edge so it coincides with four inches of the long edge. This gives the diagonal as indicated by dotted line in Fig. 18.

Fold the rectangle marked "A" over on to the square and proceed to fold the square into sixteen small squares. Allow the part "A" to unfold and of the sixteen squares cut and fold the house as directed in a previous outline. The part "A" forms the bottom and a projection to the front and back. Cut away part of each projection. Allow the one in the back to fold upward and paste to the end of the house. The corners of the one in the front may be rounded.

From the remaining paper cut a piece 2″x6″. Apply paste to a good portion of the strip and roll around a lead pencil. This is similar to the way the

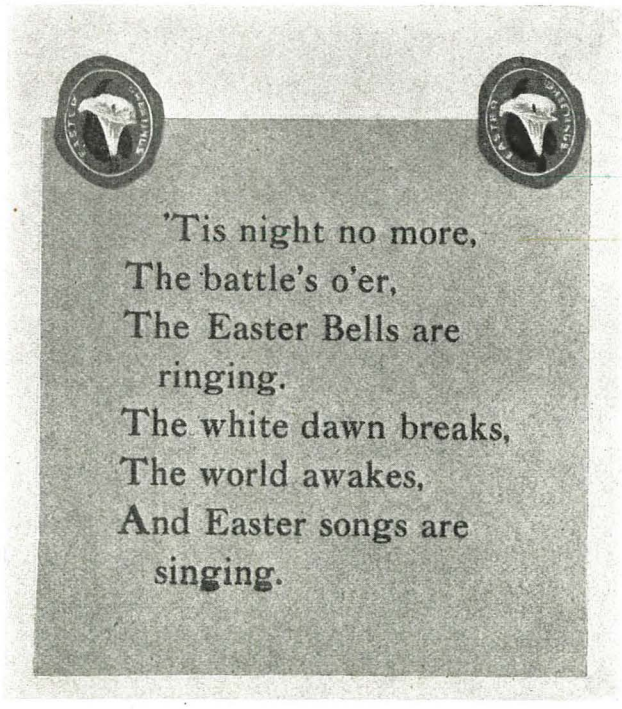


Fig. 21.

logs were made in the construction of the loghouse. Remove pencil and allow the tube to dry. When dry cut down about $\frac{1}{2}$ or $\frac{3}{4}$ in. as shown in Fig. 19. Press these strips outward and paste to bottom of house as shown in Fig. 20.

Easter Cards.

Most attractive Easter cards may be made by combining the various tinted construction papers.

Fig. 21 shows a finished card and folder. Fig. 22 shows the drawing of the folder. Fig. 23 shows verse printed on a rectangular piece of construction paper of one tint pasted to a larger rectangle of another tint, and then to the inside of the folder. Fig. 24 shows the folder when closed.

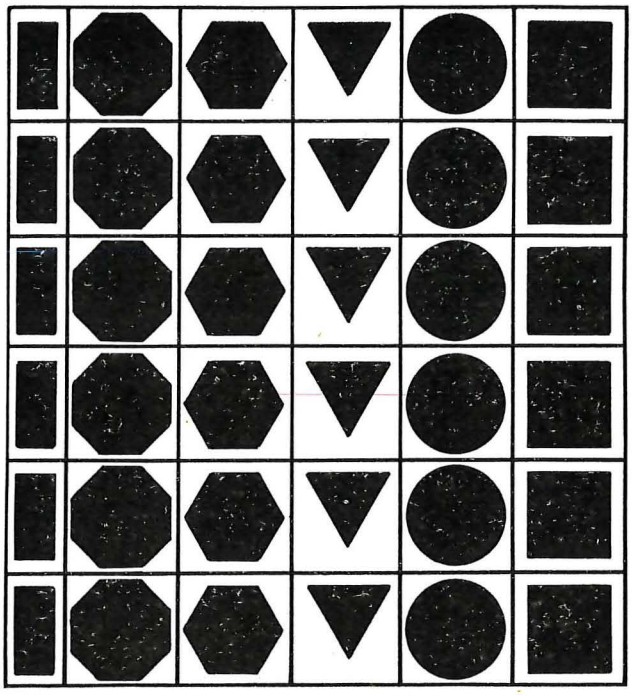


Fig. 25.

Very interesting Easter stickers of little chickens and flowers may be found in the market.

Envelope.

From construction paper make an envelope into which the colored geometric forms used in the geometric game may be placed when not in use.

The envelope may be constructed similar to the one made in September and used as a "cutting envelope."

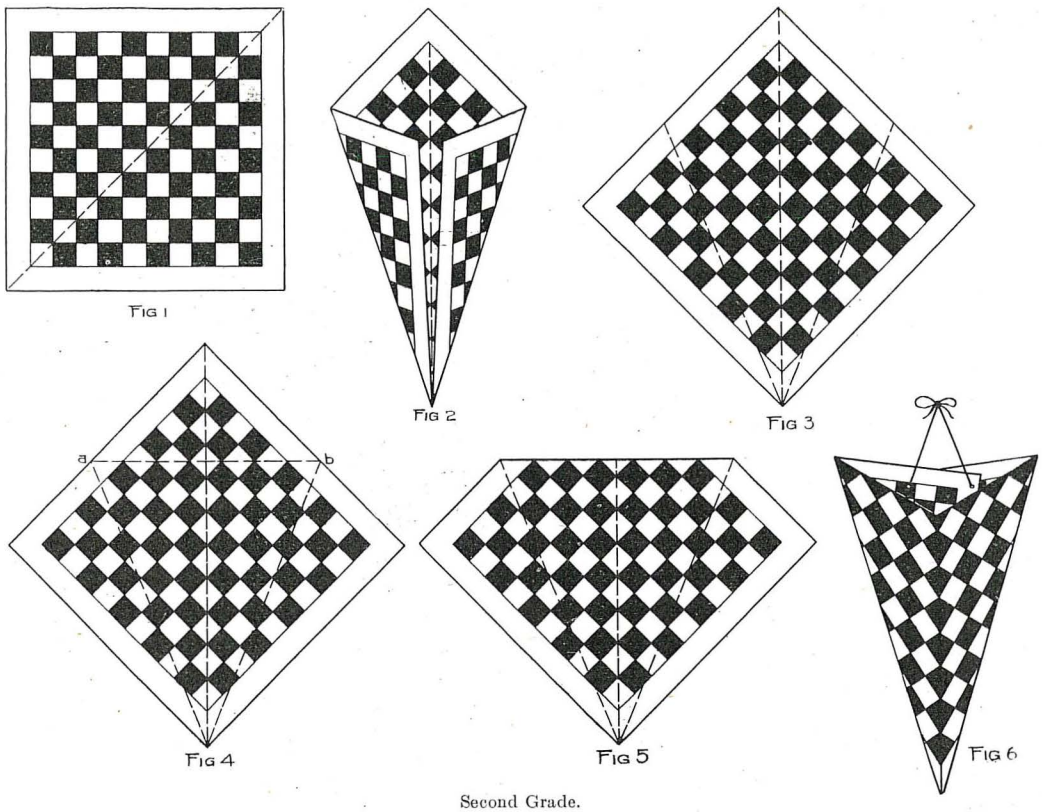
Geometric Game.

Fig. 25 shows six different geometric forms. The forms are printed in six primary colors. Allow the pupils to cut around the outer edge of each form.

Fig. 26 shows the board on which the geometric forms are to be placed. In the top row of rectangles 2, is found the names of the various forms in both print and script.

square square	oblong oblong	circle circle	triangle triangle	hexagon hexagon	octagon octagon
red red	violet violet	blue blue	green green	yellow yellow	orange orange
orange orange	red red	violet violet	blue blue	green green	yellow yellow
yellow yellow	orange orange	red red	violet violet	blue blue	green green
green green	yellow yellow	orange orange	red red	violet violet	blue blue
blue blue	green green	yellow yellow	orange orange	red red	violet violet
violet violet	blue blue	green green	yellow yellow	orange orange	red red

Fig. 26.



Second Grade.

In the squares just under these names the pupils will place the form asked for in print and script and also the right color. This makes a most fascinating line of seat work and adds to the child's vocabulary—new words in both print and script.

Other Ways of Using the Board.

The board may be used on which to place other counting material, such as shoe pegs, lentils, seeds, etc.

The colored geometric forms may be used in laying borders and other designs.

APRIL.

Construction Work for Second Grade.

Cutting and Tearing.

The cutting and tearing for this month centers around the Easter interests and the various signs of spring.

Have the pupils cut and tear flowers, rabbits, chickens, ducks, etc. Continue to have the pupils observe the various signs of spring and then to cut or tear in paper. Girls jumping rope and boys playing marbles make interesting cuttings.

Modeling.

Chickens, ducks, rabbits, model to illustrate games.

Spelling Book.

Construct a spelling book similar to the one previously described.

It would be a most excellent plan to make a book for each month of the school year. It no doubt would add a great deal to the interest in spelling and offers excellent opportunity to make practical the applied art.

May Basket.

Single Weave. In the January outline direction was given for the weaving of a square mat. This exercise may be repeated at this time, but instead of using the weaving as a mat it may be folded into an attractive May basket.

First. Fold diagonal of square mat, Fig. 1.
Second. Fold edges to diagonal, Fig. 2.
Third. Unfold, Fig. 3.
Fourth. Fold on dotted line "ab", Fig. 4.
This triangle folds to the back, Fig. 5.
Fifth. Let "a" overlap "b" at back, Fig. 6.

Punch at back and make hanger of macrame twine or candle wicking, Fig. 6.

Decoration of Basket.

If the teacher so desires the pupils may be allowed to again turn to the stick printing. An interesting print might be stamped on each light square of the mat, thus adding considerable interest to the finished basket.

Double Woven May Basket.

Material:

Two rectangles, each $4\frac{1}{2}''$x$2\frac{1}{2}''$, of different tints or contrasting colors of tinted construction paper.

Purpose:

To keep before the pupils the custom of hanging May baskets.

To give experience in combining tints of the same color, or combining contrasting colors.

To present number in the concrete.

Presentation:

Present to the class a finished basket. Compare with the double woven basket suggested in previous outline, and the Easter basket woven of the strips. Take the finished basket apart, so that the pupils may see that it is constructed of two rectangles cut into strips, each strip being double and closed at the ends.

Construction of Basket.

For convenience, the basket will be made of blue and white paper. Cut a rectangle of each color $2\frac{1}{2}''$x9''. Fold each so the short edges come together. Fig. 7. Draw a line $1\frac{1}{2}''$ from the open short edges and parallel to same. Fig. 7. On the line just drawn place dots $\frac{1}{2}''$ apart. Place dots $\frac{1}{2}''$ apart on the closed edge just opposite and connect corresponding dots by straight lines. Fig. 8. Cut from closed edge along lines just drawn.

Place the two rectangles at right angles, as shown in Fig. 9. Begin to weave the double strip of white No. 1 into the blue strips. Open the blue and let the white pass thru double. Next, open the white and let the blue pass thru the white double. Open the white and admit the blue. Continue until the end of the strip is reached.

Allow the woven strip to push along to make room for strip 2 of the white, which is woven from the bottom. It starts out opening the white, allowing the blue to pass thru. Continue until this strip is woven. Push the woven strips along to make room for each new one. Continue until all the white strips are woven. It then should look as shown in Fig. 10.

Round the corners of the rectangles and turn the basket as shown in Fig. 11. Add handle of paper.

May Basket.

Place upon the blackboard the pattern drawing of a May basket, as shown in Fig. 12. Make the drawing large enough so that it may easily be seen from any part of the room. The pupils understand that all dotted lines are to be folded and all continuous lines are cut. Fold and paste as shown in Fig. 13. It will be observed that the quarter-inch appears in this basket. To avoid the quarter-inch have the pupils measure a half-inch and then divide the space approximately.

The band around the top is a strip of paper cut freehand about one-quarter inch wide.

Original Problem.

Pass to each child a 9''x12'' piece of drawing, or tinted construction paper, asking each to construct a May basket.

Easter Cards.

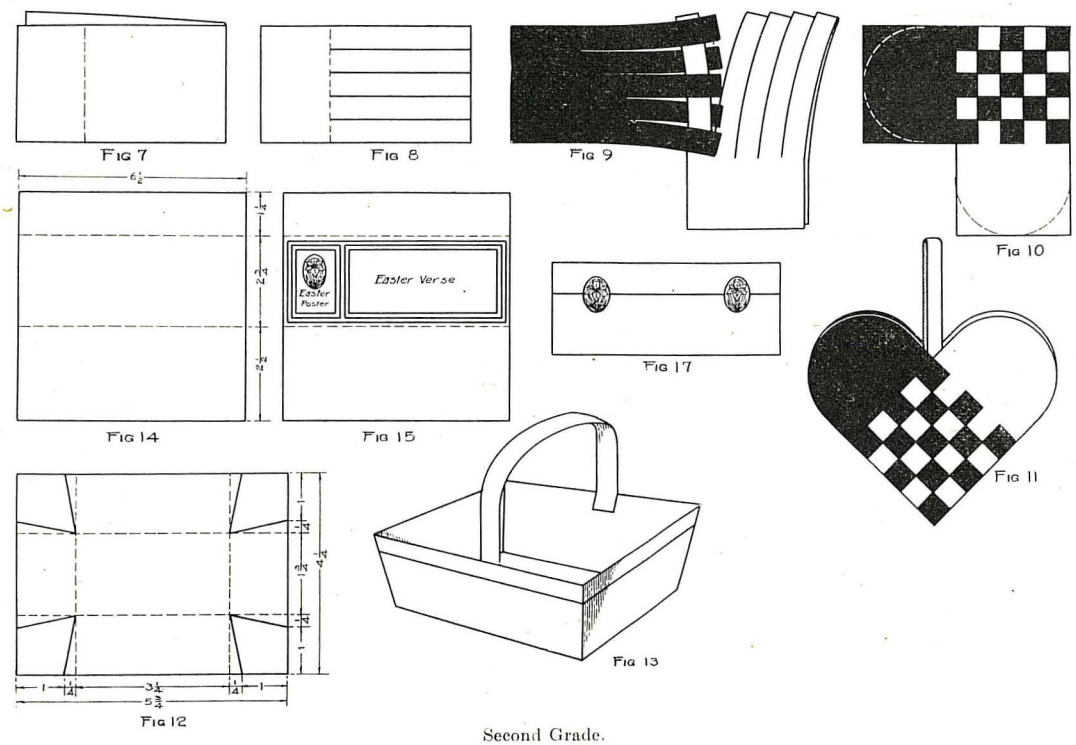
Most attractive Easter cards may be made by combining two rectangles of different sizes and colors. On the smaller rectangle hektograph an Easter sentiment. A small Easter sticker in the right place adds to the card.

Fig. 14 shows the dimensions used in the Easter card folder. Fig. 15 shows the arrangement of the rectangles and Fig. 16 shows the card placed within the folder, while Fig. 17 shows the closed folder.

Word Building Game.

Fig. 18 shows the exercise as it appears on the manila document paper.

Cut on the continuous lines the same as in exercises mentioned in previous outlines. When cut it will be found that the ending at right of sheet will



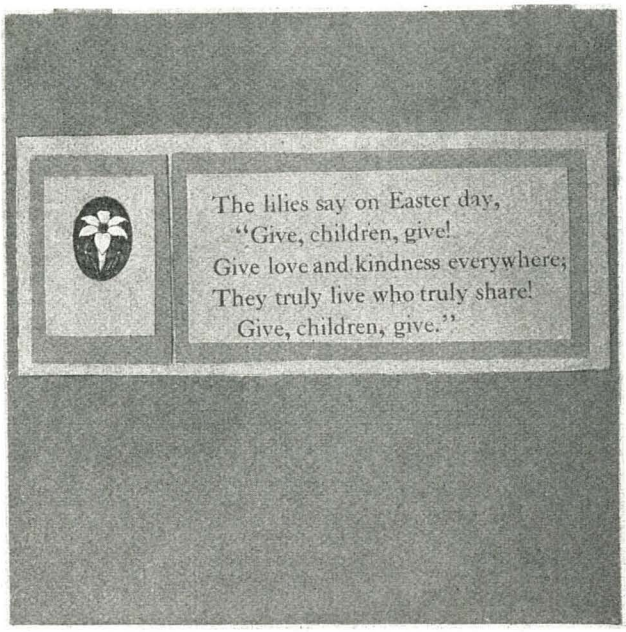


Fig. 16. Second Grade.

all be left on one strip. Each letter will be found separate on a half-inch square of manila document.

To Play the Game.

The long strip on which the endings are found is placed in a vertical position on the desk. Each letter is picked up and placed before the proper ending. Encourage the pupils to place each letter as it is picked up. They are so often apt to begin with the first of the list and work down to the end. A great deal of time is lost in this way. The idea is to place each letter, whether before the first or last ending, just so it is in the right place.

If it is thought desirable the initial letters for each ending may at first be left in one strip and placed before the endings. In this way the pupils become familiar with the work.

Later cut on the dividing lines and proceed as above mentioned.

Envelope for Game.

From a 6″x9″ piece of construction paper fold an envelope long enough to hold the long strip on which the endings are printed.

APRIL.

Construction Work for Third Grade.

Cutting and Tearing.

The work of this grade since the interests center about Easter is similar to that of the First and Second Grades.

Have the pupils cut and tear flowers, rabbits, chickens, ducks, etc. The Easter display in the various stores will offer many suggestions to the pupils.

Clay.

If there is clay on hand use it in the modeling of any of the above suggestions for Cutting and Tearing.

Folio.

Material:

Cover paper for outside covering, lining, and pockets.

Cloth board cut $7\frac{1}{2}$x$9\frac{1}{4}$″.

Bookbinders' cloth.

Narrow tape Star No. 29.

Flour paste.

Purpose:

To provide a place to keep drawings, number and language papers.

To teach system.

To teach neatness, accuracy, and skill.

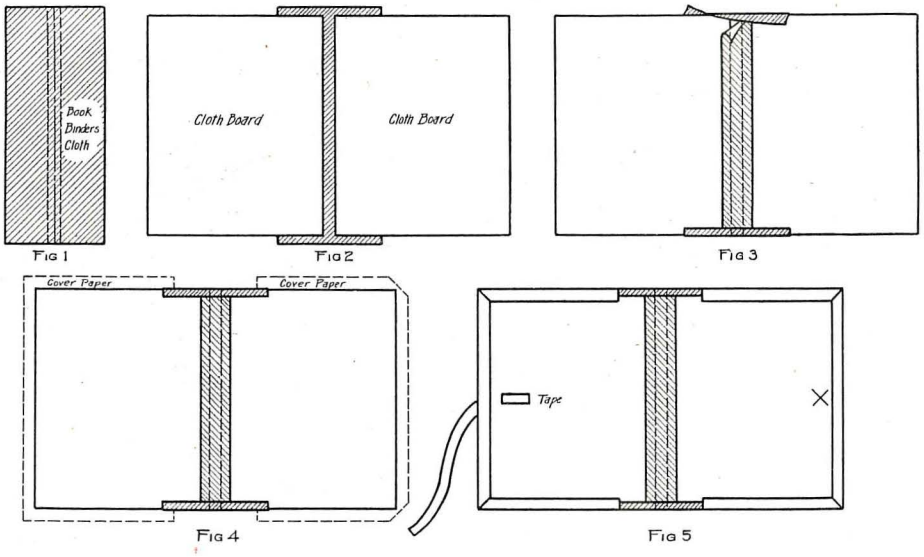
To provide a means of teaching number in the concrete.

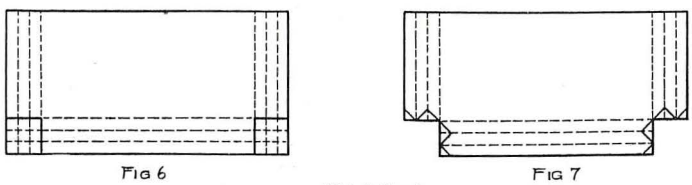
Presentation:

After a short discussion on the folio and its use, present to the class a finished folio. Discuss the value of the stiff covers,—the pockets,—why a dark paper cover is better for school purposes than the lighter shades—way of putting in the tape, etc.

To Construct the Folio.

First. Cut a strip of bookbinders' cloth $4\frac{1}{4}$″x 10″. Draw a lead pencil line down center of strip





Third Grade.

on under side. $\frac{1}{4}''$ each side of this line and parallel to it, draw other lines. There is now a half-inch strip measured off thru the center. Fig. 1.

Second. Apply paste to entire strip. Lay covers lengthwise on the pasted strip so that one long edge of each cover just meets the lead pencil line at each side of center. There is now a space of $\frac{1}{2}$ inch between the covers. Fig. 2. The covers are so placed as to allow a surplus at top and bottom. Fig. 2.

Third. On the inside and down the center, lay another pasted strip of bookbinders' cloth $1\frac{1}{4}''$ wide and just as long as the cover. Press down well with a cloth. Turn the surplus at top and bottom over to inside of book. Fig. 3. It is very necessary that, in order to secure good work, the covers be laid (open) in a book press. Lay a narrow strip of strawboard down center between the covers.

Fourth. In a day or two, the bookbinders' cloth will have dried so that the work may be resumed without danger of the covers coming apart.

How large must a piece of cover paper be to cover one side of the folio, if the paper is to extend about one-quarter inch over the edge of the bookbinders' cloth, and one-half inch over the edges of the foundation cover (the clothboard), as shown by dotted lines? Fig. 4, (left cover). After the cover paper has been cut for the two sides, apply paste *to the cover paper*, and place it on the cover. Press well on the right side, and before turning edges over to inside of cover, cut away piece at corner as indicated in Fig. 4 (right side). Fold over edge at top and bottom first, and then the long edge. Fig. 5 shows edges turned (right side).

Paste other side of cover.

After the cover paper has been pasted, the work should be placed in the press.

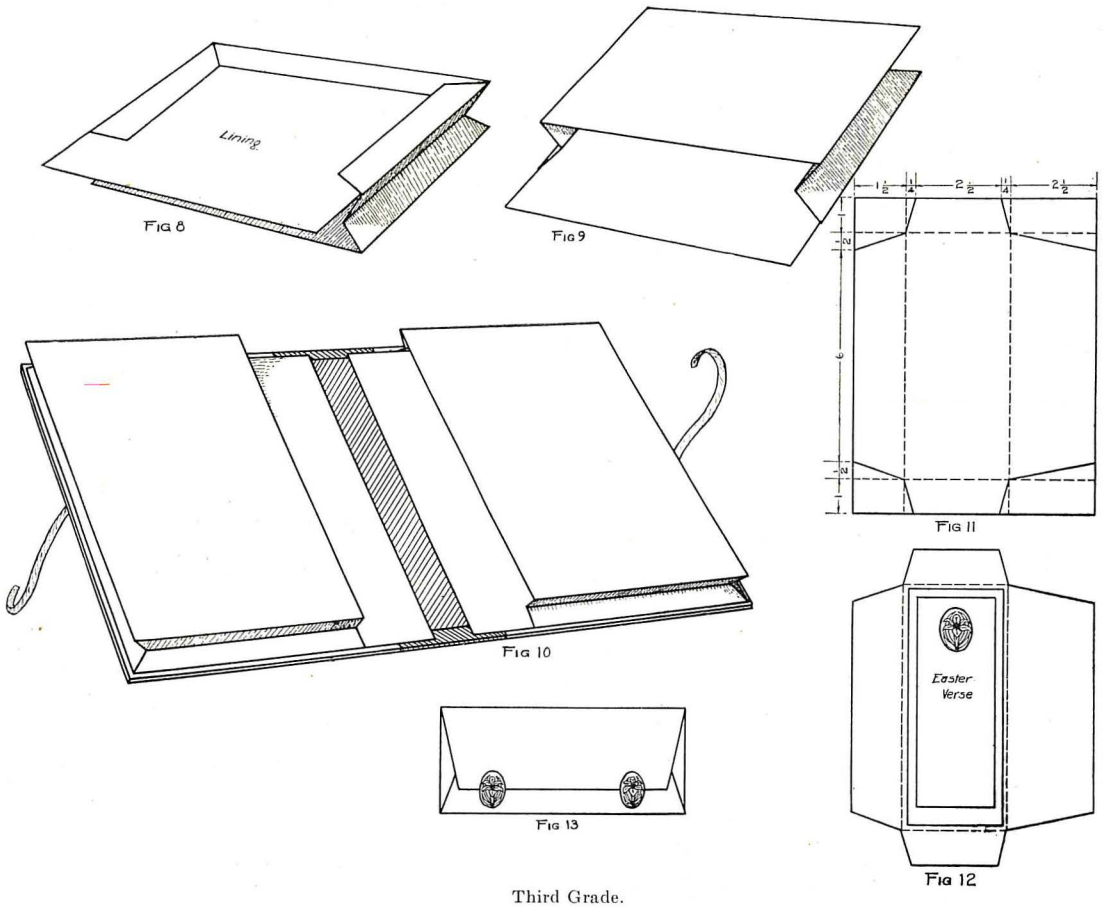
Fifth. The tape should now be placed. Cut two pieces of tape, each 9 inches long. With a punch, or an $\frac{1}{8}''$ or $\frac{1}{4}''$ chisel (borrowed from the manual training department), cut or punch each side of cover about one inch from long edge and half way from top to bottom edges, as indicated by cross in Fig. 5 (right side). The tape is drawn thru the opening and pasted to inside of cover. Fig. 5 (left side).

Sixth. *The Lining.* How large must a piece of cover paper be to cover about $\frac{1}{4}''$ of the bookbinders' cloth down the back, and that will come about $\frac{1}{8}$ of an inch from the edges of the cover?

After the lining has been cut to the proper size, the pockets are placed on the lining before the lining is pasted to inside of covers.

Seventh. *The Pockets.* Cut a strip of cover paper 6 inches wide and 3 inches longer than the lining. Mark off half inches as shown in Fig. 6.

Divide the space at bottom and right and left



Third Grade.

sides into three parts. Fold back and forth on dotted lines as tho making a fan. Fig. 7. Cut away corners as indicated in Fig. 7.

Allow the lining to slip into outer fold, pasting this fold to under side of lining. Fig. 8. Fig. 9 shows right side.

Paste is now applied to under side of lining (with pocket attached), and pasted to inside of cover, so the pockets open to the inside of book. Fig. 10.

If the pocket opening points toward outer edge of covers, the contents will drop out of pocket as soon as the tapes are untied.

May Baskets.

Material:

Tinted construction paper.

Purpose:

To keep before the pupils the custom of the making and the giving of May baskets.

To give concrete number.

To have the pupils think constructively.

To have pupils form habits of neatness and accuracy.

Presentation:

May baskets should be made the latter part of April. They may be constructed any time during the month.

Avoid presenting the baskets to the class in a mechanical way. Show to the pupils

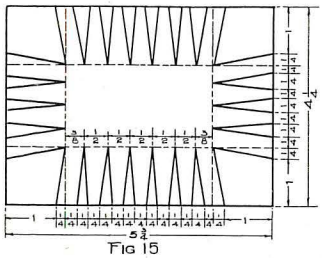


Fig 15

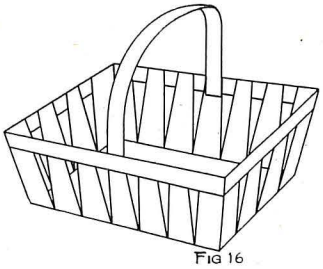


Fig 16

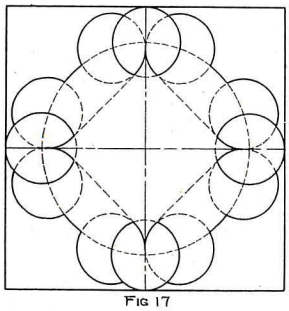


Fig 17

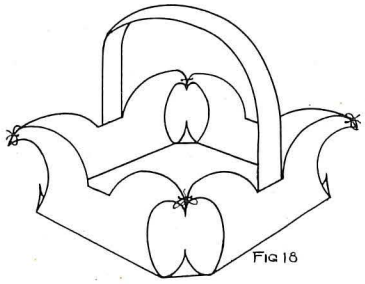


Fig 18

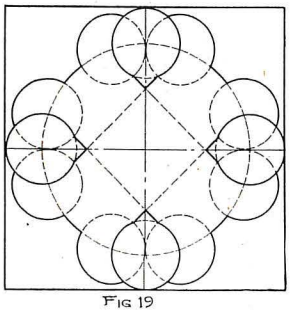


Fig 19

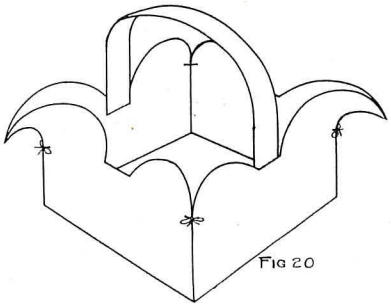


Fig 20

Third Grade.

the finished baskets suggested in the outline. Do these baskets bear resemblance to anything the class has constructed? How large a piece of paper do you think it will take to construct the basket suggested in Fig. 16? How would you proceed to construct the basket? Allow different pupils to express their ideas. If necessary, take the basket apart so its construction may be more easily understood. Pass to each pupil the necessary materials and tools and ask him to make a basket as nearly like the one presented to him as he can.

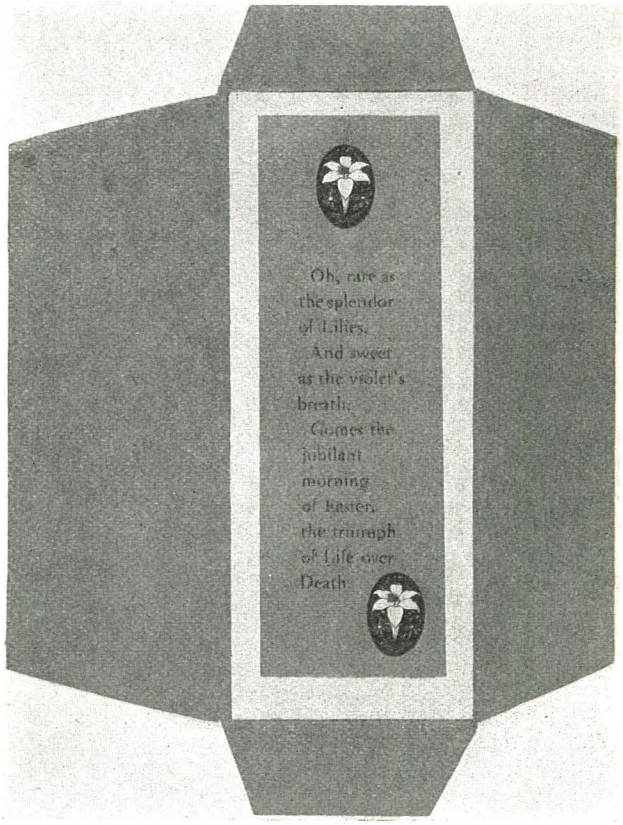


Fig. 14. Third Grade.

Easter Cards.

The Easter cards and folders never grow old to the pupils of the lower grades.

Fig. 11 shows the drawing for a folder while Fig. 12 shows the card placed and pasted to the inside of the folder. Fig. 13 shows the folder closed with the Easter seals. Fig. 14 shows the card and verse used.

May Basket.

Place upon the board a drawing of Fig. 15 large enough so that it may be seen from any part of the room. The pupils, understanding the meaning of the various dotted and continuous lines, should be allowed to construct the basket without help after receiving the material for same.

It must be remembered that all continuous lines are cut and all dotted lines are scored. The strip

around the top of the basket as shown in Fig. 16, is 12″ long and ¼″ wide. Before pasting the strip it is creased into four parts just fitting the sides and ends. Do the creasing in such a way that the seam will come at the middle of a side or end. Fig. 16 shows finished basket.

May Basket.

In this basket is found the circle. If the pupils do not have a compass proceed to make one as suggested in a previous outline. It might be well for the teacher and pupils to work together in the construction of this basket. Fig. 18.

Before beginning to construct the basket, give a review in the use of the circle maker by having the pupils draw a 6″, a 4″, and an 8″ circle. Let him determine that he will want 3″ on the circle maker to draw a 6″ circle; 2″ for a 4″ circle; 4″ to draw an 8″ circle.

To Construct the Basket.

First. Draw a 6″ circle.

Second. Bisect the circumference of 6″ circle, both vertically and horizontally by placing dots on circumference.

Third. With each of the points as a center draw a 2″ circle.

Fourth. Where these circles intersect the large one as a center, draw other 2″ circles. Fig. 17.

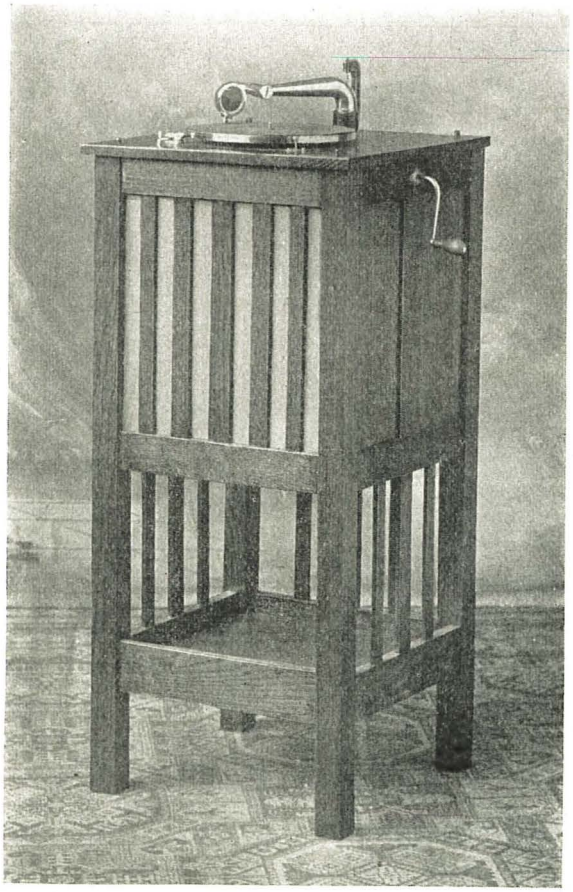
Fifth. Draw square in center. This is done by placing the ruler across the points where the middle 2″ circle interesects each of the others.

Sixth. Cut along outer edge and along heavy lines. Crease on dotted lines and tie at corner. Cut handle 8½″x1½″.

Fig. 18 shows the finished basket.

Easter Basket.

The drawing for this basket is the same as shown in Fig. 17. The cutting, however, is somewhat different. The entire center circle of each group of three is cut away. This cutting is indicated by the heavy lines shown in Fig. 19. Fig. 20 shows the finished basket tied at the corners.



Designed and made by a student in the Spring Valley, Minn., High School, Stanley Mythaler, Instructor.

HAND WORK IN THE RURAL SCHOOLS

Charles A. King, East Kingston, N. H.

THE conservative attitude of certain members of rural school boards toward "frills" and "new fangled notions" is largely responsible for the backward condition of many of the rural schools of the older states. The kind of conservatism which hesitates to accept a new thought or to make an important change until assured it is for the best is highly commendable, but the ultra-conservative who in this day and time refuses to consider any new thing and who clings to the old, because of unbelief in the possibility of improving time honored and familiar institutions and methods, may certainly be suspected of having something wrong in his mental processes.

The obstacles which modern educators are obliged to overcome in their endeavors to introduce scientific methods in a city school system are usually due to the latter type of conservatism, rather than a lack of money for equipment and maintenance.

In the rural districts the principal reason for the same conservatism is the lack of information, the isolation and the prohibitive cost of a special teacher and equipment. The realization of this fact has made useless the discussion of this subject, which has therefore never been adequately presented to the people of many rural districts. There is no doubt that in many cases these reasons are ample but the study of rural school conditions in the older states by state and county officers, has led to certain changes in the training of teachers in anticipation of the future needs of small towns and villages.

In order to carry out the plans for the betterment of the rural schools, each teacher, besides being able to teach and correlate with usual school subjects the elements of domestic arts, hygiene, nature study and agriculture, should have a fair working knowledge of the care and use of the fundamental woodworking tools, and the application of the simpler processes and forms of construction; she should not have the knowledge of a specialist, but she should be able to conduct a small class in woodwork and attain modest but worth-while results.

Product of a Rural Teacher at the Normal School, Plymouth, N. H.

In adapting the courses of the State Normal School at Plymouth, N. H., to this viewpoint, we have hitched our wagon to the star of individual effort, not teaching any particular series of projects except at the beginning of the work, when we make several simple models which offer opportunities for drill in the use of the common tools and allow the teacher to estimate the natural aptitude of each student.

After this preliminary work has been completed, each student is allowed to select her own projects, guided by the teacher. The character of the approved work is based upon the desires and the aptitude indicated by the student in her previous work. If she can work with sufficient accuracy to make a piece of the desired form and of the given dimensions, she has qualified in the most difficult process applied in the making of a piece of furniture of simple design. Each of the different pieces of a table, bookcase, desk, chest, or of any other article which appeals to the feminine mind may be made separately, and no piece requires a higher degree of accuracy in its details than is expected from a student doing average work in the grade schools. By using simple joints, the butted and screwed, the grooved, the dowelled or halved joints, these pieces may be assembled into a really desirable piece of furniture, the making of which is within the ability of the majority of young ladies of normal school age. On account of the wide range of work under way in each class and the opportunity for observation, each student acquires a knowledge of tools, materials and processes, and a broader outlook upon handwork than would be possible if the classwork consisted of a rigid course for each student regardless of any other consideration.

Often the teacher whose training in the manual arts has consisted of a series of models which each member of her class made, considers them and their sequence immutable, and being familiar with this one course is more than likely to lose sight of the opportunity for touching the farm and home life of her students.

The thousand-and-one articles of use in the different departments of a general farm offer a far broader field than is possible in a city home, but they

have been exploited mainly from the viewpoint of the agricultural college. Woodwork of the nature required upon the average farm is peculiarly adaptable to the uses of the teacher who has not been trained as a specialist but to teach woodwork as any other subject in the curriculum. Material for kitchen, barn, and poultry appliances, gates, whiffletrees, eveners, etc., can be found upon almost any farm, or may be obtained in any rural community, hence the question of supplies is simplified.

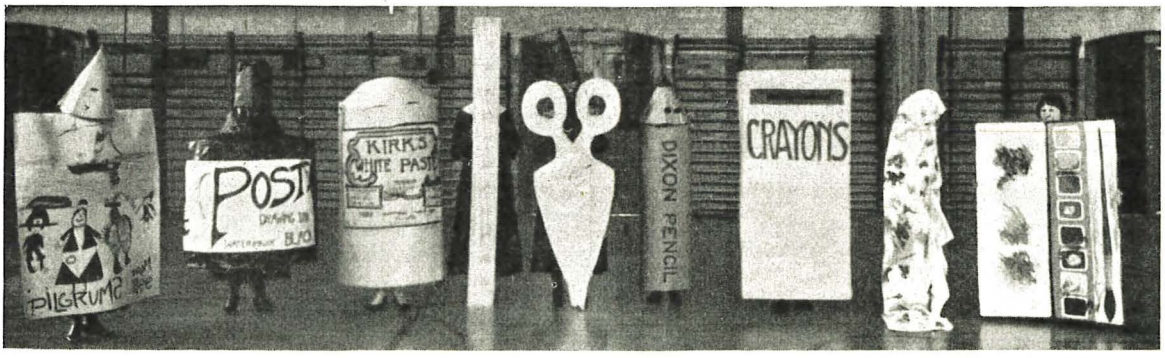
As farm woodwork is for use and not for ornament, a knowledge of the care and use of the common tools, and the application of the simpler tool processes and forms of construction covers the technical knowledge necessary for teaching woodwork of this description. Projects of this type involving only fairly accurate work will be of more educational value to the boy of the grade school age than the making of a number of such models as are usually produced in the city classes of manual arts.

The pedagogical error that the attainment of accuracy is the aim and end of educational handwork is passing; instead the psychological basis of the newer viewpoint is that the best avenue of approach to the child's mind is parallel to his interests. The holding of a child to a piece of work until he has lost all eagerness of interest, even tho it may result in an accurate product, is not giving him the greatest benefit for the time expended.

The fact that a high degree of accuracy is not natural to the normal child of grade-school age is recognized, also that the average youth of high-school age will easily and naturally attain a degree of accuracy entirely beyond that possible to most boys of eleven or twelve, even as the result of pressure by the teacher, the application of which is sure to cause loss of interest, hence the efficiency of the strongest educational factor is greatly minimized.

It is true that this may be dangerous doctrine if applied by an untrained teacher, as it is very easy to fall into the error of thinking that the maintenance of interest is the end sought, and miss the essential idea that interest is but the means by which the most important mental and physical results in the child may be attained. It is equally true that the conception of the educational value of a high degree of accuracy having been modified by psychological research, may lead the teacher to the other extreme, and permit her to accept from many of her pupils a degree of accuracy less than they might accomplish with judicious encouragement and advice.

This change in viewpoint alone justifies the modest ideals and endeavors of the normally trained teacher to introduce woodwork in the rural districts, and makes possible the bringing of certain modern educational methods to thousands of pupils of the rural schools at an expense within the means of any town or village which desires them.



AN ARTIST'S CUPBOARD.

At a recent school party of the Kalamazoo, Mich., Schoolmaster's Club, the art teachers prepared an artist's cupboard as shown above. The teachers themselves took the part of inks, scissors, drawing paper, etc. The "stunt" was enthusiastically received.

INDUSTRIAL-ARTS MAGAZINE

EDITORIAL

SCHOOL EFFICIENCY AND MANUAL TRAINING.

ONCE in a great while, a superintendent is heard to announce that he cannot see that manual training has done anything to improve the attendance, character, or efficiency of the work of schools.

When one hears such a statement, the well known influences of manual training upon the attendance, work and character of school boys come to mind and make one wonder what can be the matter with manual training in places where such critics get their information.

Perhaps the besetting danger to manual training is, and always has been, the tendency to take on the formal, bookish routine of the academic subjects. This lifeless routine and lack of significance constitute the one thing that brought the academic school work into disrepute and set up the demand for real, vital, concrete work in the form of manual training. Hence, when manual training falls back upon formal discipline and deadening bookish routine, it is simply guilty of the identical crime of which it has so long and so persistently accused Latin, Greek, formal grammar, and other academic subjects.

Whenever a superintendent makes the statement that manual training has failed to vitalize the work of the school and to increase its interest and efficiency, he makes a rather damaging charge against his own efficiency. He should be led to appreciate the fact that he either fails to understand what is going on in the manual training work, or else he is tolerating a very inferior *kind* and *grade* of manual training. In either case, *he* must bear a large share of the blame.

There are three things for such a person to do. First, he should inform himself as to what first-class manual training work is like. Second, he should bring into his schools teachers who are capable of doing such work. Third, he should surround these teachers with conditions that make such work possible.

INEFFICIENT SUPERVISION.

THE whole machinery of the public school system exists in order that the boys and girls may be efficiently *taught*. The business of the supervisor is to organize the work, to handle the administrative details, and to look after the character, methods, and results of the teaching in his department. When these items are properly attended to, the supervisor will have but little time for other things.

Complaints frequently come from teachers that they get no suggestion, advice, or helpful criticism from their supervisors. When asked what they *do* get from the supervisors, they reply, "Oh, nails, glue, sandpaper, and blueprints."

Teachers need counsel, advice, and criticism of the right sort. Especially is this so of young teachers. Supervisors cannot assume that a teacher, however well prepared, can enter a department and go right to work on his own initiative without direction and careful guidance. Especially young teachers should not be turned loose to succeed or fail. They should be safeguarded from blunders. Conscientious mistakes should not be permitted to weigh too heavily against them. Teachers must *grow*; and this is a slow process. The best of us are none too nearly perfect. A well known, efficient supervisor remarked recently, "I couldn't attend the meeting, because I had a new teacher on my force and I had to stay at home and 'break him in.' " This man's teachers all boast that they have a "*real* supervisor."

It is very important, furthermore, that a supervisor's teachers should have no reason to conclude that he lives the easy life with nothing in particular of importance to do. Such an impression is all the more exasperating when a teacher meets with a rebuff, or a bit of sarcasm, when he seeks advice concerning a construction, a method, a matter of discipline, or anything else.

The supervisor's attitude should be such as to make his teachers feel that his fundamental concern is to help them to be the very best teachers possible, in order that the boys and girls whom they teach may profit by their excellence.

THE SMITH-HUGHES LAW.

By far the most important act of recent years so far as vocational education is concerned is the Smith-Hughes Act appropriating federal funds to the various states for vocational education which was passed by Congress and signed by the President, February 23rd. The Bill as finally passed provides for a Federal Board of Control consisting of the Secretary of Commerce, the Secretary of Labor, Secretary of Agriculture, Commissioner of Education, and three appointed members one of whom is to be a manufacturer, another representing employees and one representing agricultural interests. This Federal Board of Control has authority to employ as many experts as may be necessary in administering the Law.

The *Industrial-Arts Magazine* has received a number of inquiries regarding the steps necessary to be taken by the states in order to qualify for the federal funds. It is extremely important that the states conform to the legal requirements of the Bill in order to qualify for the federal money. The edi-

tors have, therefore, made a careful investigation in order to give an authentic statement regarding the points involved in the Law. Those responsible for the provisions of the Federal Act have provided us with the following information.

There are four things the states must do in order to qualify for National money under the Act:

(1) The State Legislature must formally accept the provisions of the National Act. In doing this the National Act must be clearly described. This is done by setting forth in the section accepting the National Act a description of it by its title and by the date of its approval. This date of approval is the day when the President signed the measure which was on Friday, February 23, 1917.

In the case of the states whose legislatures are now in session the implication of the National Act is that the legislature must accept the Smith-Hughes Act by a statute and not delegate the matter into the hands of the governor. The Smith-Hughes Act provides that, because some of the states do not have their assemblies this year, such states may direct the governor of the state to formally accept the provisions of the Act until the legislature of the state meets in its regular biennial session. The clear implication of this is that where legislatures are now in session they must themselves act rather than delegate action into the hands of the governor as the agent of the legislature.

(2) The legislature must state what fund or funds it desires to accept. The safe thing to do is to accept the benefits of all the Federal funds in some such language as this: that the benefit of all funds allotted to the state under the provisions of the National Act are hereby accepted.

There are three funds involved, one for the salaries of teachers of agricultural subjects, one for the salaries of teachers of industrial and home economics subjects, and one for the training of teachers of agricultural, industrial and home economics subjects.

The Law does not say that the Legislature must accept the benefit of all these funds in order that the state may qualify for federal aid under the Smith-Hughes Act. It does say that the state must designate what fund or funds it desires. It is barely possible that the State Board of Control for the state could take this action altho there is a doubt. The safest thing to do is to have the Legislature formally accept all the benefits under the National Act.

(3) The Legislature shall designate the State Treasurer as custodian of the National Fund, charge him with the duty and responsibility of administering this fund subject to the provisions of the National Act.

(4) The Legislature shall designate or create a State Board of Control charged with the duty of responsibility and equipped with the necessary power to co-operate with the National Board of Control in administering the federal money allotted to the state under the provisions of the National Act. The Legislature of Wisconsin, for example, can designate the State Industrial Education Board now charged under the statutes of the state with the administration of vocational education, particularly of continuation schools, as the State Board of Control for dealing with this work. The Legislature could create an entirely separate Board made up of at least three members. The Legislature could designate some other Board already in existence in the state, as for instance the State Committee on Industrial Relations. The first seems by far the most natural and preferable way to handle this matter.

Attention should be called here to the significance of the situation should the Legislature of a state designate any Board as the State Board of Control for dealing with the National government. So far as the federal moneys are concerned that State Board is the Board of Control for the money without any restrictions except those imposed directly by the Legislature. If none are imposed, then the State Board is absolutely supreme in the administration of these federal moneys.

THE GARY SURVEY.

The educational world has been waiting with considerable interest the appearance of the Report of the Survey which has been made of the Gary schools. There have been so many conflicting statements made and such varied opinions formed of the Gary system that all educators desire to see the results of a careful evaluation of the work of the schools.

The Surveyors completed their first examination last June and it was reported that they were to make additional studies before submitting their report. It is now rumored that their report makes severe adverse criticisms of the Gary school system and it is also rumored that those in authority are not particularly anxious to have the findings of the survey made public.

The Gary system has been heralded as a successful educational experiment which is to revolutionize educational practice. Many superintendents have felt the effects of the Gary propaganda. The Gary schools were visited by perhaps more people than any other school system in the country. It is only fair that the findings of a survey made by unbiased experts be given full publicity. School men have a perfect right to know the results of this study and if those who are responsible for it wish to be professional they will publish those findings at the earliest possible moment and not allow any statements made by surveyors to be buried, regardless of the nature of the findings or what the consequences may be.

THE SMITH-HUGHES ACT

A SUMMARY

The Smith-Hughes Act which is the culmination of a nine years' campaign for national recognition of vocational education on the part of the National Society for the Promotion of Industrial Education, was finally passed by the House of Representatives on February 16, 1917, and was acted upon favorably by the Senate on the following day. It became a law on February 23rd when President Wilson signed it with four pens made especially for the occasion by the boys of a vocational school in Buffalo. In the belief that the provisions of the law are of more than usual interest, we reproduce here the rather complete summary prepared by the Bureau of Education.

"An Act to provide for the promotion of vocational education; to provide for co-operation with the states in the promotion of such education in agriculture and the trades and industries; to provide for co-operation, with the states in the preparation of teachers of vocational subjects; and to appropriate money and regulate its expenditure."

Sec. 1. Appropriates sums provided in sections two, three, four, and seven.

Sec. 2. For the purpose of co-operating with the states in paying the salaries of teachers, supervisors, or directors of agricultural subjects, the following appropriations are made: For fiscal year, ending June 30, 1918, $500,000; fiscal year 1919, $750,000; fiscal year 1920, $1,000,000; fiscal year 1921, $1,250,000; fiscal year 1922, $1,500,000; fiscal year 1923, $1,750,000; fiscal year 1924, $2,000,000; fiscal year 1925, $2,500,000; fiscal year 1926, and annually thereafter, $3,000,000. Sum alloted to state in proportion which its rural population bears to total rural population of U. S. Proviso: No state shall receive annually less than $5,000 prior to 1923, nor less than $10,000 after that year; deficiency appropriations to provide this "minimum allotment."

Sec. 3. For the purpose of co-operating with the states in paying the salaries of teachers (note omission of supervisors and directors) of trade, home economics and industrial subjects, the following appropriations are made: For fiscal year ending June 30, 1918, $500,000; fiscal year 1919, $750,000; fiscal year 1920, $1,000,000; fiscal year 1921, $1,250,000; fiscal year 1922, $1,500,000; fiscal year 1923, $1,750,000; fiscal year 1924, $2,000,000; fiscal year 1925, $2,500,000; fiscal year 1926, and annually thereafter, $3,000,000. Sum allotted to state in proportion which its urban population bears to total urban population of U. S. Same proviso for "minimum allotment" as in Sec. 2; deficiency appropriations slightly larger. Not more than 20 per cent of sum appropriated in this section shall be expended for salaries of teachers of home economics.

Sec. 4. For the purpose of co-operating with the states in preparing teachers, supervisors, and directors of agricultural subjects and teachers of trade and industrial and home economics subjects the following appropriations are made: For the fiscal year ending June 30, 1918, $500,000; fiscal year 1919, $700,000; fiscal year 1920, $900,000; fiscal year 1921, and annually thereafter, $1,000,000. Sum allotted to state in proportion which its population bears to total population of U. S. Proviso: No state shall receive annually less than $5,000 prior to 1919, nor less than $10,000 after that year; deficiency appropriations to provide this "minimum allotment."

Sec. 5. In order to secure the benefits provided in sections two, three, and four, state shall, thru legislative authority thereof, accept the provisions of this Act and designate or create a state board, consisting of not less than three members, and having power to co-operate with the Federal Board for Vocational Education. State board of education, or other board having charge of the administration of public education, or other State board having charge of the administration of any kind of vocational education ("State department of education" was stricken out by Conference Committee) may be designated for the purposes of this act. In states whose legislature does not meet in 1917, governor, in so far as he is authorized, accept provisions of this act and "designate or create a state board of not less than three members to act in co-operation with the Federal Board." Any state may accept benefits of any one or more of the funds herein created. Proviso: After June 30, 1920, no state shall receive any appropriation for salaries of teachers, supervisors, or directors of agricultural subjects until it has taken advantage of at least the minimum amount appropriated for the training of teachers, supervisors, or directors of agricultural subjects. Same provision as to appropriation for salaries of teachers of trade, home economics, and industrial subjects.

Sec. 6. Federal Board for Vocational Education created. To consist of Secretaries of Agriculture, Commerce, and Labor, Commissioner of Education, and three citizens appointed by the President; one of appointive members to represent manufacturing and commercial interests, one to represent agriculture, and one to represent labor. Chairman elected by board. Term of appointive members, three years; one appointed each year. Salary of appointive members, $5,000. Board to make investigations and reports. Investigations and reports on agriculture may be made in co-operation with or thru Department of Agriculture. Likewise investigations of commerce and commercial pursuits thru the Department of Commerce. Studies, investigations and reports "concerning the administration of vocational schools, courses of study and instruction in vocational subjects" may be made in co-operation with and thru the Bureau of Education. Commissioner of Education authorized to make recommendations relative to the administration of this act. Chairman to carry out rules of Board. Board may employ assistants.

Sec. 7. The sum of $200,000 is appropriated for the administration of the act, for the payment of salaries of officers and assistants, etc. Board may allot any part of this appropriation to any U. S. department or bureau for the purpose of making any study or investigation contemplated in this Act.

Sec. 8. To secure the benefits of appropriation, state board "shall prepare plans showing the kinds of vocational education for which it is proposed that the appropriation shall be used; the kinds of schools and equipment; courses of study; methods of instruction; qualifications of teachers; and, in the case of agricultural subjects, the qualifications of supervisors or directors; plans for the training of teachers; and, in the case of agricultural subjects, plans for the supervision of agricultural education, as provided in section 10." Such plans to be submitted to Federal Board. State board shall report annually to Federal Board on or before September 1.

Sec. 9. Appropriations herein made to be expended only for salaries of teachers, supervisors, or directors, as herein provided. "The cost of instruction supplementary to the instruction in agriculture and in trade, home economics, and industrial subjects provided for in this act, necessary to build a well-rounded course of training, shall be borne by the state and local communities, and no part of the cost thereof shall be borne out of the appropriations herein made." Appropriations conditioned that the state or local community, or both, shall expend an equal amount for salaries.

Sec. 10. Any state may use appropriation for agricultural purposes, or any part thereof, for the salaries of teachers, supervisors, or directors of agricultural subjects under a plan to be set up by state board, with the approval of Federal Board. In order to receive the benefits of such appropriation, state board shall provide in its plan for agricultural education that it shall be under public supervision or control; that its purpose shall be to fit for useful employment; that it shall be less than of college grade and designed for persons over 14 years of age; that the state or local community, or both, shall provide plant and equipment as determined upon

by state board with approval of Federal Board; that amount expended for any school or class shall be not less than amount fixed by state board with approval of Federal Board, for such schools or classes in the state; that such schools shall provide for supervised practice in agriculture for at least six months per year; that teachers shall have at least minimum qualifications determined by state board with approval of Federal Board.

Sec. 11. In order to receive benefits of appropriation for salaries of teachers of trade, home economics, and industrial subjects state board shall provide in its plan that such education shall be given in schools or classes under public supervision or control; that the controlling purpose shall be to fit for useful employment; that such education shall be of less than college grade and designed for persons over 14 years of age who are preparing for, or who have entered upon, the work of a trade or industrial pursuit; that state or community, or both, shall provide approved plant and equipment; that total amount expended in any school or class shall not be less annually than amount fixed by state board with approval of Federal Board; that schools or classes for persons not entered upon employment shall be devoted to practical work for not less than nine months in the year and not less than 30 hours per week; that at least one-third of sum appropriated to state shall be devoted to part-time schools or classes for workers over 14 years of age; that part-time schools or classes shall provide not less than 144 hours of classroom instruction per year; that evening industrial schools shall be for persons over 16 years of age; that qualifications of teachers shall be not less than those fixed by state board with approval of Federal Board. Proviso: For cities of less than 25,000 inhabitants, state board, with approval of Federal Board, may modify length of course and hours of instruction for those not in employment.

Sec. 12. In order to receive benefits of appropriation for training teachers, supervisors, or directors of agricultural subjects or teachers of trade, home economics, or industrial subjects, state board shall provide in its plan that same shall be carried on under state board; that such training shall be in schools or classes under public supervision or control; that it shall be given only to persons having "adequate vocational experience or contact in the line of work for which they are preparing themselves" or who are acquiring such experience; that state board, with approval of Federal Board, shall establish minimum requirements for such experience; that not more than 60 per cent nor less than 20 per cent of appropriation to any state for training of teachers shall be expended for any of following purposes: preparation of teachers, supervisors, or directors of agriculture; or teachers of trade and industrial subjects; or teachers of home economics.

Sec. 13. In order to receive benefits of this act State shall thru its legislative authority appoint its State Treasurer as custodian of funds herein appropriated.

Sec. 14. Federal Board shall annually ascertain whether the states are using or are prepared to use the money appropriated to them. On or before January 1 each year Board shall certify to Secretary of the Treasury states accepting act and complying with its provisions and amount to which each state is entitled. Said Secretary shall pay quarterly. State Treasurer shall pay out funds on requisition of state board.

Sec. 15. "Whenever any portion of the fund annually allotted to any state has not been expended for the purpose provided for in this act, a sum equal to such portion shall be deducted by the Federal Board from the next succeeding annual allotment from such fund to such state."

Sec. 16. Federal Board shall withhold allotment to any state when moneys are not being expended "for the purposes and under the conditions of this act." State board may appeal to Congress; if Congress denies appeal, money covered into Treasury.

Sec. 17. Appropriations under this act which may be "diminished or lost" while in the hands of a state treasurer shall be replaced by the state; until state so replaces funds, it shall receive no further allotment. No part of appropriations under this act shall be applied to the "purchase, erection, preservation or repair of any building or buildings or equipment, or for the purchase or rental of lands, or for the support of any religious or privately owned or conducted school or college."

Sec. 18. Federal Board shall report annually on or before December 1 to Congress and shall include in such report the reports of state boards.

MEETING OF THE NATIONAL SOCIETY FOR THE PROMOTION OF INDUSTRIAL EDUCATION

The tenth annual meeting of the Society for the Promotion of Industrial Education has just closed. The convention was held in Indianapolis, February 21 to 24.

Altho as might be expected, the personnel of the membership and the speakers was practically the same as in previous years, the addresses and the spirit of the meetings were very different indeed. The stormy debates that formerly characterized the meetings of this organization were noticeably absent from Indianapolis.

There was a constant drift in the addresses toward reminiscence and the calm satisfaction that comes of memories of hard fought battles and of deeds well done. The air of achievement pervaded every session and pointed to the Smith-Hughes Bill as the trophy.

The first day of the meeting was given up wholly to a conference of Employment Managers. Well known men from many of the largest commercial establishments in the country came with messages concerning employment problems, the handling of men, etc. This conference undoubtedly made some real contributions to the subject of vocational education at the point where it most vitally touches the industrial world.

A large part of the program of the general sessions following the first day, was centered about the Indiana Survey that was just recently finished. The reports of the surveys made in four of the important cities of Indiana were distributed to the members and were used as a basis for much of the discussion. The needs, purposes, methods, and findings of the Indiana survey were explained and discussed by Dr. Book, Dr. Prosser, Dr. Winslow, Mrs. Prince, and others intimately connected with the work of making this survey.

The general program gave generous recognition to the various interests involved in the movement for vocational education, including the various commercial interests, the labor interests, agricultural interests, and the school interests representing fully the work for both the boys and the girls. Yet in addition to this, there were provided six sectional meetings dealing with the various aspects of the narrower and more specialized fields of the vocational work.

On Thursday evening, February 22, occurred the annual banquet attended by about three hundred people. The program consisted of a number of hearty welcomes by Indianapolis ladies and of addresses by Dr. Prosser, of Dunwoody Institute, and Dr. Bryan, of Indiana University. In the course of the evening, a telegram was received from President Wilson indicating that he would sign the Smith-Hughes Bill the following day and congratulating the Society on its excellent work. Likewise, messages were received from Secretary Redfield, Senators Smith and Page, and Congressman Hughes. The reading of these messages was a signal for enthusiastic demonstrations.

Following the reading of the telegrams, Dr. Dean, of New York, volunteered to read a kind of roll of honor and to pay most complimentary tributes to the men and women who conceived the idea of this great organization and who persistently and tirelessly carried forward its work until the final achievement of the Smith-Hughes Law.

In his address, Dr. Prosser seemed to voice the senti-

ment of the Society, when he declared that altho a vocational education law had been secured, there would still be strenuous and vitally important work for the Society to do. There still remains a need for a permanent organization at whose annual conventions the problems, the policies, and the progress of vocational education may be discussed.

Among the most enjoyable and profitable parts of the program, were the informal conferences and dinners held by the various groups of specialists in the different fields of work. The programs for these conferences were made up of recognized leaders in their particular lines. The following specialists were among those who participated in the conference programs: Mr. Brodhead, of Boston; Mr. Bogan, of Chicago; Dr. Snedden, of New York; Miss Lord, of Pratt Institute; Miss McKay, of Iowa; Miss Marshall, of New York; Mr. Dennis, of Pennsylvania; and Mr. Wright, of Kansas City, and many others.

It would be difficult to select from so rich a field of active effort and so varied a body of excellent material which the program provided, the most genuinely constructive and helpful thing accomplished at the meeting. However, if one might be justified in making the attempt, it would not be far amiss to say that such distinction belongs to the conference that met Friday morning for a brief session and concluded its efforts Friday evening at the close of the dinners and other conferences of the evening. This conference was not on the program. It was presided over by Dr. Dean and Dr. Prosser. At the morning session only a comparatively small number were present. As a result of this conference, there were formulated a number of very definite recommendations to the various states as to the wise courses to follow in asking for legislation to take advantage of the provisions of the Smith-Hughes Bill. At the evening session, a copy of these recommendations was furnished each person in the large meeting. The recommendations were minutely considered and were modified in such manner in some instances, as to bring about a practically unanimous agreement on all the recommendations with the exception of two on which there seemed to be a diversity of opinion. The list of recommendations is appended herewith. Officers for the ensuing year were elected as follows:

President—Cheesman A. Herrick, president of Girard College, Philadelphia.

Vice-President—Clarence H. Howard, president Commonwealth Steel Company, St. Louis, Mo.

Treasurer—Frederick B. Pratt, Brooklyn, N. Y.

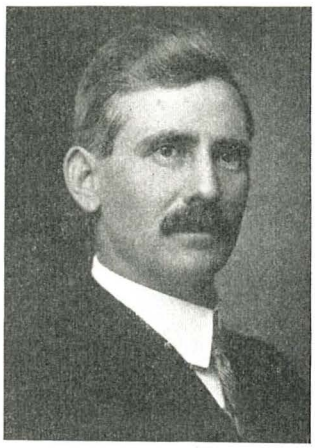
—*S. J. Vaughn.*

ILLINOIS MANUAL ARTS ASSOCIATION.

Fourteenth Annual Meeting — Peoria, Feb. 9-10, 1917.

The fourteenth annual meeting of the Illinois Manual Arts Association was well attended, and one of the most enjoyable and profitable meetings in the history of this live and progressive organization. The program was well planned and varied in its subject matter, appealing to the many interests represented in the membership. An encouraging feature was the interest in the Household Arts Section which was well attended by domestic science and art teachers from various parts of the state. Until last year it was felt that this side of the work had not been well represented on the programs and a definite move was made to interest these teachers in the work of the association.

The banquet, always an enjoyable affair in the meetings of the association, was made doubly profitable by the two able addresses, one by Owen R. Lovejoy, Secretary of the Child Labor Committee, who spoke on Social Aspect of Education; and Miss Agnes K. Hanna, of the Department of Home Economics of the University of Chicago, whose topic "The Disparity Between Aims and Attainments in Household Arts Courses" was ably handled. Mr. Lovejoy called attention to the common goal toward which the manual arts people and the child labor committee were working, namely the better preparation of the child for citizenship. He emphasized the need of industrial preparedness as compared to the demand for military preparedness which is sweeping the country, decrying the attitude which permits such niggardly attention and support to industrial education, from which all parts of the country are suffering.



L. A. TUGGLE,
Pres. Manual Arts Association.
Danville, Ill

RALPH F. WINDOES,
Pres. Illinois and Iowa Industrial Arts Association, Davenport, Ia.

Matthew P. Adams, Superintendent of the Mooseheart Vocational School at Mooseheart, described the work of this institution, which deals with the dependent children of the members of the Loyal Order of Moose, all sections of the country including Alaska being represented in the community, ranging in age from the tiniest tots to 21 years of age.

Mr. Worst explained in an interesting way the work which is being developed in the elementary schools of Chicago, and at the conclusion of his talk was surrounded by an interested group eager for further practical suggestions which could be carried home and put into immediate practice.

Prof. Fred. D. Crawshaw gave a very helpful talk on the organization side of the manual training work, developing many valuable points for those who have administrative work to do. Mr. Dragoo, of Illinois Normal University, opened up the subject of adequate preparation of teachers and precipitated quite a discussion as to the qualities most necessary.

In the Household Arts Section, Mrs. Helen M. Sabin, of the Lucy Flower School, Chicago, Miss Edna L. Skinner, James Millikin University, Miss Bliss, of Blackburn College, and Miss Minnie M. Peterson, of Peoria, discussed various phases of their work.

At the business session, the Survey Committee presented a printed summary of their findings, dealing with the present status of manual arts instruction in Illinois.

Mr. Wahlstrom, of Chicago, suggested that the association take up the question of publishing a bulletin which would keep the members in touch with one another and with the movement in various parts of the state. On motion of Prof. Chas. A. Bennett, of Peoria, this was adopted. A spirited discussion followed as to the advisability of keeping up interest in the work during the year and Mr. Wahlstrom suggested the forming of centers thruout the state to keep the various members in the immediate neighborhood in touch with one another, and with other groups thruout the state, the bulletin serving as a tie to bind the various groups together. This suggestion was discussed and after the adjournment several such groups were planned, and possibilities for work of these groups outlined.

The officers elected for the coming year are:

President—L. A. Tuggle, Supervisor of Manual Training, Danville; Vice-President, Miss Bertha Case, Peoria; Secretary-Treasurer, Herman J. Barber, Chicago; Editor, Mr. Denham, Decatur.

Ottawa was selected as the next meeting place.

—*Leonard Wahlstrom.*

THE EASTERN ARTS CONVENTION.

The Eastern Arts Association is preparing for the largest convention in its history to be held on April 5, 6, and 7. The convention will meet in the historic city of Philadelphia where preparations are being made for a larger exhibit and for a larger attendance than has been anticipated or realized in any previous year.

The convention headquarters will be at the Hotel Walton, and all of the meetings, as well as the exhibit, will be located at Drexel Institute. The arrangement is as nearly ideal as can be found in any city, and at the present writing the officers of the association have assurances that the school exhibits as well as the commercial exhibits will be nearly double the exhibits shown last year at Springfield, Mass.

It is planned to devote Thursday and Saturday of the convention to general programs in which the most important men and women in the field of industrial and art education will participate. Among the speakers already provided are: Dr. Hollis Godfrey, President, Drexel Institute; Dr. Balliet, Dean, School of Pedagogy, New York University; Dr. Arthur D. Dean, Director of Vocational and Industrial Education, New York State; Prof. Arthur F. Payne, Bradley Polytechnic Institute, Peoria, Ill.; Wesley W. Miller, Pennsylvania Museum and School of Industrial Arts; Sarah Louise Arnold, Dean, Simmons College; Dr. James P. Haney, Director of Art in High Schools, New York City; Prof. Albert E. McKinley, University of Pennsylvania, and Mr. Henry Turner Bailey.

The entire Friday of the convention will be given over to sectional conferences, exhibits, and visits to local schools and industrial plants. The dinner will be held Thursday evening and the exhibits will be given especial attention on Friday evening.

Arrangements have been made by the local committee to provide for special visits to the continuation schools of the City of Philadelphia, to the Wanamaker Continuation School, to the Philadelphia Museum and School of Industrial Arts, to the University of Pennsylvania, and to the various industrial and commercial establishments of the city.

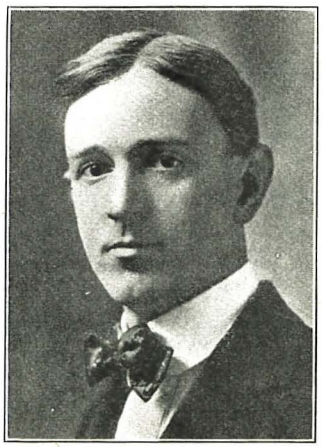
The officers of the association are:

President—Royal B. Farnum, Albany, N. Y.
Vice-President—E. E. MacNary, Springfield, Mass.
Secretary—Fred P. Reagle, Montclair, N. J.
Treasurer—Morris Greenberg, Brooklyn, N. Y.
Chairman, Local Committee—Dr. Cheesman A. Herrick, Philadelphia, Pa.

MEETING OF THE SCHOOL CRAFTS CLUB OF NEW YORK.

The School Crafts Club, of New York, held its monthly Round Table meeting on February 10th, at the rooms of the Society of Mechanical Engineers. President Haynes presided at the opening session.

The meeting was in six groups, *Arts and Crafts* in charge of Mr. Arthur F. Payne; *Elementary Schools* in charge of Mr. Martin J. Corcoran; *High Schools* in charge of Mr. Edward Berman; *Vocational Education* in charge of Mr. J. W. Burley; *Agricultural Education* in charge of Mr. E. G. Traua, and *Printing* in charge of Mr. R. A. Loomis. Mr. Payne who spoke at the first round table, on "Appreciation of Good Design and Craftsmanship in Manual Training" pointed to the changing values in the field of education and criticized especially the tendency to substitute vocational education for manual training. Mr Payne showed that vocational education when given in a common blueprint way, has very little of educational value. Manual training correlated with other subjects is of real educational value and justifies a permanent place in the curriculum. Speaking on the opportunity of educational growth, Mr. Payne said in part: "The opportunity of individual growth has been amply proven by the excellent results in manual training work in this country. The old cut-and-dried course of models must give way to a course of problems where the child has a part in the discussion and the final solution. When we train pupils to recognize the limitations of the uses, materials, processes and finishes we have taken a most important step in the solution of the problem. If we are to present constructive and decorative design in tangible form, capable of being interpreted by students, it must be accomplished by well planned and thoughtfully developed systems. Design on paper is not complete until it finds a definite realization in the medium for which it was intended and produced by the tools appropriate to that medium. Finally, 'Good Design is simply formulated common sense.' "



ROYAL B. FARNUM,
President.

FRED P. REAGLE,
Secretary.

Executive Officers of the Eastern Arts Association.

The second topic on "The Content of the Manual Training Course," was discussed by Mr. Corcoran. He defined a manual training course as one made up of those subjects and emphasizing those ideas which are useful in long ranges to human experience. He urged that work in wood be subordinated to a secondary place and that other materials be frequently used. The subject matter should have educational purpose and worth and a justifying end. It should have private and social significance adapted to the individual's understanding and capacity. The educative material should be used for the establishment of right habits and especially to generate the doing of a thing well. There should be greater respect for tools and materials and neatness should be taught by example. Mr. Corcoran recommends class projects for sixth grades where the fundamentals and correct use of tools are taught; group projects for seventh grades and individual projects for eighth grades. He urges that manual training be correlated with other subjects and that designs be sound in construction and in good form.

Mr. Berman who discussed "Methods of Teaching Mechanical Drawing in High Schools," told of the work in the Bayonne High School. The course was introduced about four and one-half years ago and has barely passed the experimental stage. The entire first term is devoted to geometrical drawing. This is of advantage in securing accuracy. A creditable term's work consists of nine plates with eighty per cent excellence. The second term consists of projections and developments, the third term is taken up with the drawing of machine parts, and the fourth term is spent in the practice of isometrical drawing and a study of motion diagrams. The fifth and sixth terms take up fully the complete rendering of machine drawing, the final exercise being the complete plans and sections of a two-cycle motor. The sixth term is spent in the study of industrial mathematics so that the student may be prepared to handle the mathematical part of his last year's work. Some attention is given to architectural drawing, tho in an elementary manner. All work is demonstrated upon the blackboard and in the case of an advanced class, an isometrical drawing is used, from which the student makes view drawings. Supplies are furnished by the school. Two pencils and an eraser are furnished, for which a deposit of five cents is asked. This is refunded if proof is shown that they have been intelligently used.

Mr. Traua, who was in charge of the fifth group, spoke on "Teaching Simple Agriculture". He outlined the work as follows: Planning; Starting Plants; Soil and Fertilizers; Shop Projects; Flowers; School Garden Literature; Lectures; Seed Houses, and Data for Planting.

At the Printing Round Table, a large placard printed in the Bayonne Vocational School, was exhibited by Mr. Thomas Somerville, teacher of printing. The placard was given to the school by the State Department as a problem for improvement in typography. Mr. R. A. Loomis, who sum-

marized the work in printing, reported that the consensus of opinion was that a great improvement has been made over the old work and that as a whole, the job is a credit to the school. Successive proofs of the job were shown and the points of improvement in each were discussed and criticized.

INDUSTRIAL ARTS ROUND TABLE.

On January 26th a group of manual training teachers from Chicago and towns in the immediate vicinity met at the Francis W. Parker School and organized a club to be known as the Industrial Arts Round Table.

Dinner was served in the school lunch room at 6:30 and after some time spent in sociability and visiting in the shops, the meeting was called to order by Mr. Leonard W. Wahlstrom, of the Francis W. Parker School, at whose suggestion the club was formed. A free discussion of the value and purpose of such a club was entered into by the various members and it was agreed that a club meeting once a month, with a dinner and some time spent in sociability preceding the meeting would be of value.

The following suggestions were made as to the activities of the club:

That the meetings be held at the various schools represented, thus giving members an opportunity to become better acquainted with each others' problems.

That members bring in exhibits of work done by students in their classes for discussion and criticism of the club as to methods and results.

That occasionally outside speakers be invited to address the club on topics of importance.

Mr. Wahlstrom was elected chairman for the balance of the present school year and a committee consisting of Mr. L. Day Perry, Joliet; Mr. Emery T. Filbey, of the University of Chicago; Mr. George A. Ross, of Lewis Institute, and Mr. Albert G. Bauersfeld, of Lane Technical School, Chicago, was appointed to act with the chairman in planning the meetings for the balance of the year.

The second meeting of the club was held at Lewis Institute on Friday, March 9th. Any one interested in joining the club should communicate with Mr. Wahlstrom, or members of the above committee.

The following cities were represented by members at the meeting: Hammond and Whiting, Ind.; Blue Island, Cicero, Des Plaines, Joliet, Oak Park, Evanston, Waukegan, Chicago.

THE DETROIT CLUB.

The Detroit Manual Training Club held its third meeting for the current school year on February 16. The program of the evening centered on the question of Broadening the Manual Training Courses in the Grammar Grades and in the Junior High Schools. The elementary school problems were discussed by a committee headed by Mr. W. H. Cox and the junior high school problems by a committee of which Mr. E. L. Mote was chairman.

The Detroit Club is one of the strongest local clubs in the Middle West and holds to a high professional standard in its programs. Its membership includes all of the Detroit teachers and a number of men from the surrounding suburbs of Highland, Windsor, etc. A feature of the work which deserves especial mention is a trip arranged annually for the president at the Club's expense. This year the president will visit the manual training and trade schools of Chicago, Milwaukee, Minneapolis, and St. Paul. The report which is made as a result of the trip, brings to the club members an insight into the progress made in other cities and permits of comparisons and local adjustments.

The officers of the club during the current year are: President, L. G. Burgess; Vice-President, Charles Spence; Secretary, Shirley Owens; Treasurer, Irving Koehler.

NEW INDUSTRIAL TEACHERS' ASSOCIATION OF NEW JERSEY.

About forty delegates from twelve county associations of the State of New Jersey met in the Girls' Vocational School, Newark, on Saturday afternoon, February 3, 1917, the object being to formulate a state organization. Officials from the State Department of Education, Mr. Carris, Mr. Reuther, and Mrs. O'Leary, were present and outlined

DR. A. D. DEAN,
Dr. Dean has resigned as specialist in Industrial Education for the New York State Department of Education to become Professor of Vocational Education in Teachers College, Columbia University.

the objects of such an organization. Mr. Fred Reagle, of Montclair, was chosen temporary chairman and called on the delegates to report the progress of their county associations. The meeting was unusually interesting and valuable to all as the work in all sections of the state was reported.

The approximate number of teachers now members of county organizations represented by the delegates totaled six hundred. The discussion resolved that a state association be formed and a committee of five is to be appointed which was instructed to draw up a tentative constitution and by-laws, place of meeting for the first convention and a program. It is expected that, at the time of the Eastern Arts Association convention in Philadelphia, April 5, 6, and 7, the customary gathering of teachers from New Jersey in social session will receive a report from this committee. —*R. A. L.*

Upon the suggestion of Henry Turner Bailey, art critic of the United States Bureau, the San Francisco, Cal., board has ordered that teachers of manual training and decorative design pursue courses at the higher institutions of learning. The studies of the teachers are intended to increase efficiency and to develop technical training.

The entire staff, headed by Director Charles L. Jacobs, has entered upon a course in the San Francisco School of Fine Arts. The course is conducted by Pedro Lemos, head of the Art School, and John Lemos, instructor at the Polytechnic High School.

The first three months will be taken up with methods, design and decoration and the next three with the development of pottery and architectural decoration. It is planned to extend the work into the high schools so that graduates may have the foundation for a vocational trade when they leave the school.

The School Art League of New York City held a joint meeting with the Municipal Art Society, the Art Alliance of America, the Art in Trades Club, and the High School Art Department on February 9th, at the Washington Irving High School. The topic for discussion was Art in Democracy.

With the completion of the industrial survey of Richmond, Ind., plans have been made for the appointment of a vocational director. The high school course has been revised to meet the recommendations of the survey committee, and the Junior High School will be reorganized shortly.

The first agricultural high school in Steuben County, Indiana, has been established at Pleasant Lake. An instructor will be employed for the entire twelve months. During the summer he will spend his time supervising club and home project work in agriculture. The remainder of the year will be spent in teaching regular school classes.

Rockford, Ill. The domestic art classes of the high school have undertaken a study of the problems involved in the judging and buying of dress goods.

PROBLEMS AND PROJECTS

The Department of Problems and Projects, which is a regular feature of the INDUSTRIAL-ARTS MAGAZINE, aims to present each month a wide variety of class and shop projects in the Industrial Arts.

Readers are invited to submit successful problems and projects.

A brief description of constructed problems, not exceeding 250 words in length, should be accompanied by a good working drawing and a good photograph. The originals of the problems in drawing, design, etc., should be sent.

Problems in benchwork, machine shop practice, turning, patternmaking, sewing, millinery, forging, cooking, jewelry, bookbinding, basketry, pottery, leather work, cement work, foundry work, and other lines of industrial-arts work are eligible for consideration.

Drawings and manuscripts should be mailed flat and should be addressed:

The Editors, INDUSTRIAL-ARTS MAGAZINE, Milwaukee, Wis.

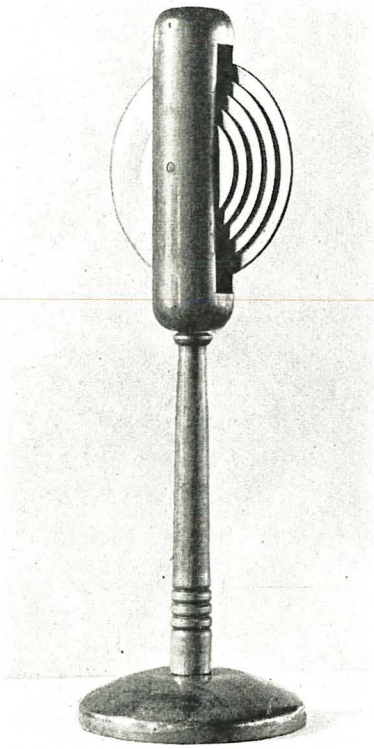
WHEEL AND AXLE.

Lee M. Klinefelter, Fort Collins, Colo.

The piece of physics laboratory apparatus shown may be made completely on the lathe, or the wheel might be turned and the base and support made at the bench. As shown, it is entirely a lathe project, and may be of use in schools with woodturning equipment, desiring to use it in adding to present equipment. It may also suggest other pieces of apparatus that lend themselves to construction on the lathe.

The base and wheel are simple face plate pieces; the standard is turned between centers, the hole in the top being bored in with a one-inch bit, either before or after the standard is turned. The frame which holds the wheel may be of one piece, or glued up of two pieces. In either case the slot is cut in before the piece is turned up. The pieces should all be carefully finished and assembled, a $\frac{3}{8}''$ hole being bored thru the frame and center of the wheel, and a piece of $\frac{3}{8}''$ round iron used for an axle.

The material thruout should be of close-grained hard wood, maple or cherry being very satisfactory.



Completed Wheel and Axle.

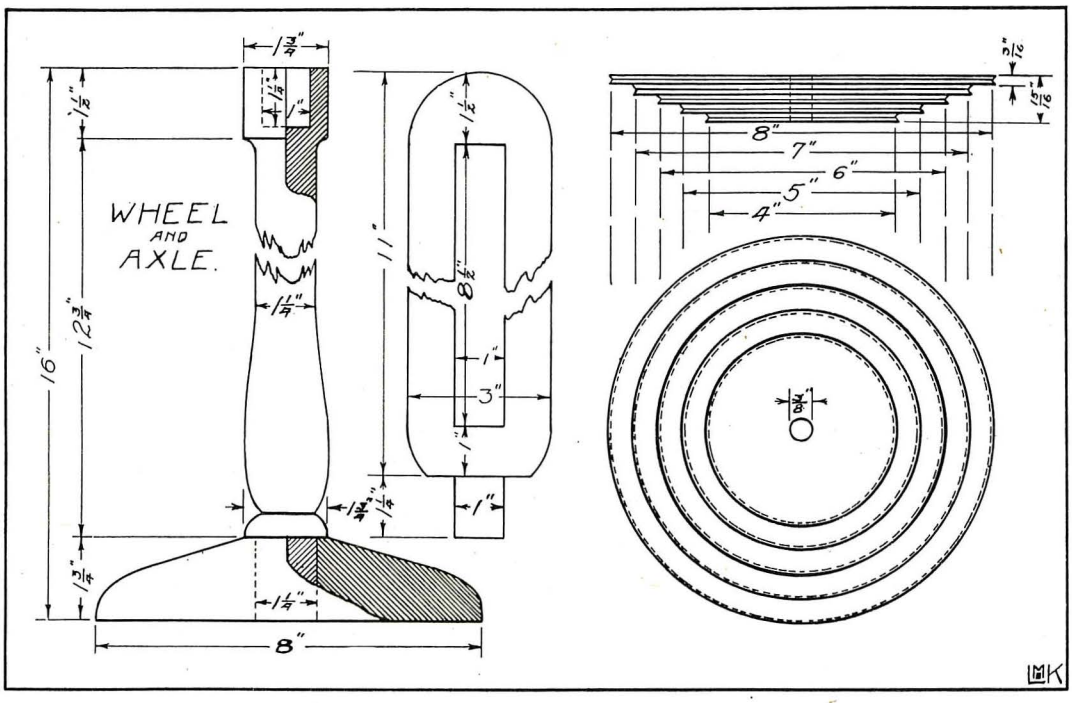
A FOLDING SCREEN.

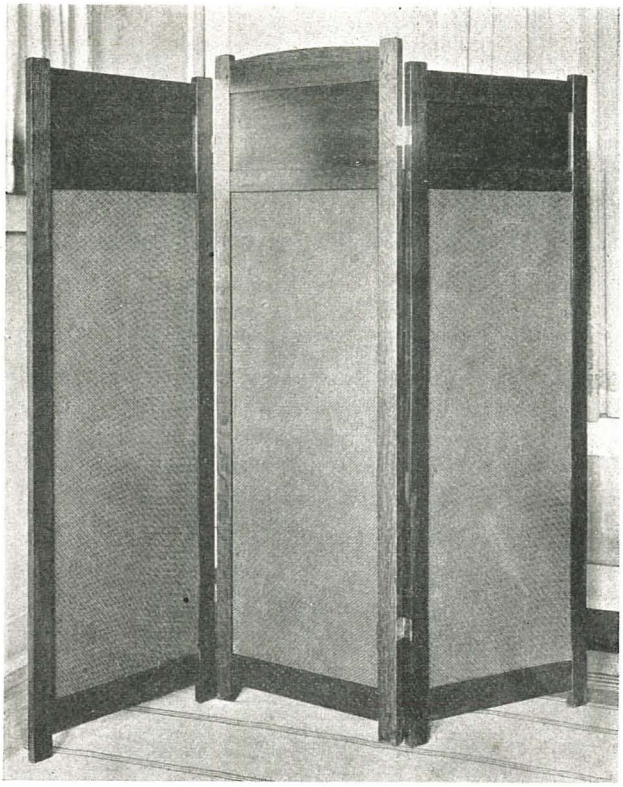
L. Day Perry, Supervisor Manual Training, Joliet, Ill.

A three-panel screen of good design is a difficult article to find in furniture houses, that is, if one is looking for the commercial product. It seems to be one thing which professional designers have neglected to bring to a proper standard.

The folding screen illustrated herewith is made of quartered white oak, fumed and finished flat; the panels are of three-ply stock good two sides; the cloth is monk's cloth, nut brown in color, stretched on and held in place by splines of oak.

The sketch shown on the drawing aims to illustrate





The Completed Screen.

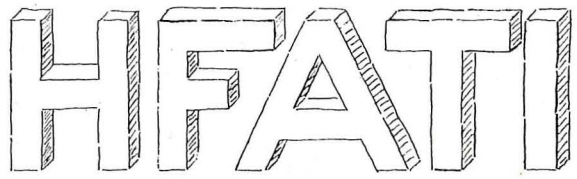
the method of fastening the material to the frame. Inserting the cloth is a job which requires two persons. Fasten one of the uprights of a frame in a vise, cut a spline to length, lay the edge of the cloth loosely over the groove, and hammer the spline with the cloth into the groove. Use a rubber mallet for this purpose. If the spline has been made the proper thickness it will hold well without any other means. Now fasten the other upright in the vise and repeat the process. Care must be taken to stretch the cloth evenly, and no great amount of stretching need be done, for as the spline is driven into the groove proper tautness of material results. Repeat the process at the short ends and trim off surplus material with a sharp knife.

This problem is a very good one for the average first-year high-school shop student, and may be undertaken by a good eighth-grade pupil. The screen shown in the photograph was constructed by an eighth-grade boy. The only difference between the drawing and the photograph is that the upper rail of the center panel or frame, in the photograph, is curved.

SOME SCHOOL DRAWING-ROOM KINKS.

E. M. Wyatt, Houston, Tex.

Proper spacing of letters is always difficult to secure. The wooden letters shown in Fig. I are very helpful in this matter. They are cut out of a half or three-eighths, three-ply board or piece of fiber board, on a band saw. They



Wooden Letters for Mechanical Drawing

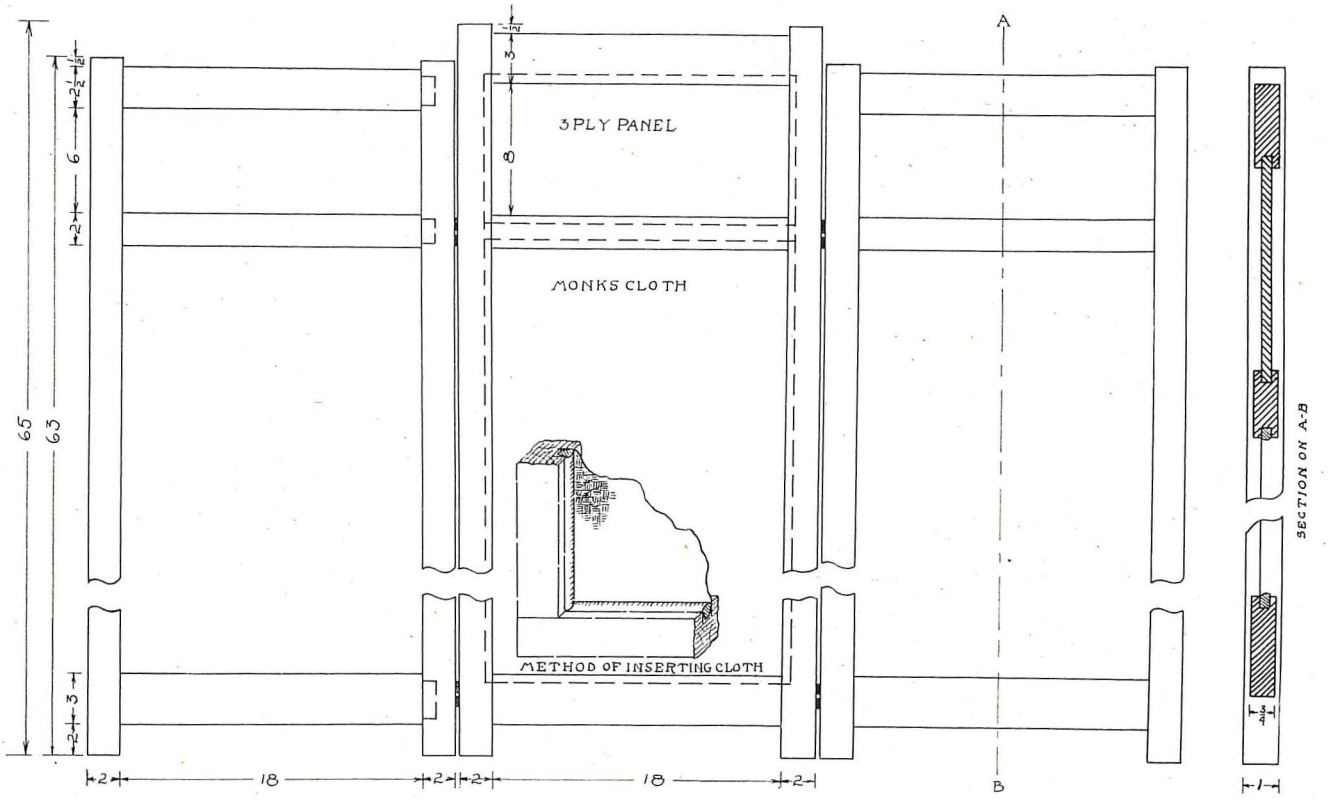
Fig. I.

should be two and a half or three inches high so that errors in workmanship are not prominent. These wooden letters make ideal models for beginning projection and isometric drawing.

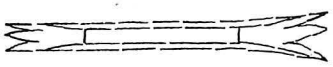
Another aid to good lettering is the little instrument shown in Fig. II. It is to be used for laying out the spacing for guide lines. If it is made small it will fit in the lead case space in the instrument case and the frequency with which it will be used will justify giving it that space.

An old extension bar makes ideal material from which

FOLDING SCREEN



to make one of these, tho an ordinary 8d nail will do very well. Cut off both ends, flatten one end with a hammer and file the points with a three-cornered file. It can be polished with



A handy drawing instrument for spacing lettering guide lines.

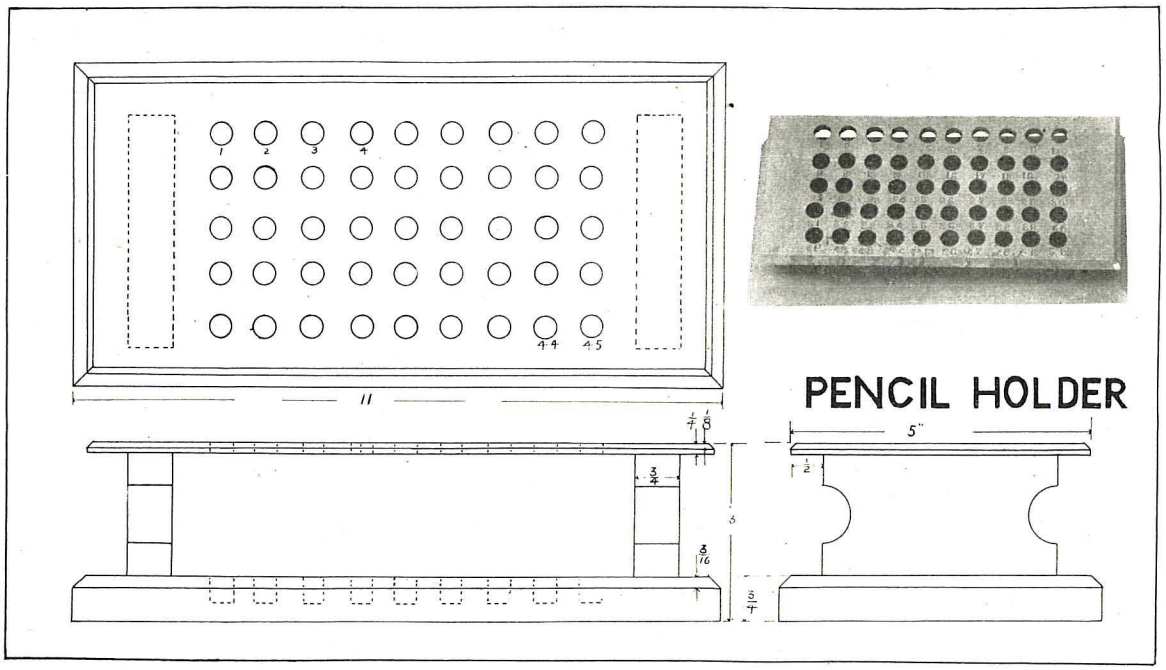
Fig. II.

fine emery cloth to make a very creditable looking instrument. The use of such an instrument with the resulting equally spaced guide lines will greatly improve the lettering of any draftsman.

PENCIL HOLDER.

H. C. Mohler, Pana, Ill.

Nearly all primary teachers have some device for keeping the school pencils so that when collected and returned to the pupils each pencil goes to the child who previously used it. The making of the holders gives an interesting problem in boring holes. Each hole is numbered with a steel stamp. For the large pencils used in the first primary it is necessary to use a half-inch bit. For the ordinary pencil a three-eighth-inch bit is used.



SEWING-MACHINE DEMONSTRATION BY PUPILS.

Marian L. Whitwood, Fresno, Cal.

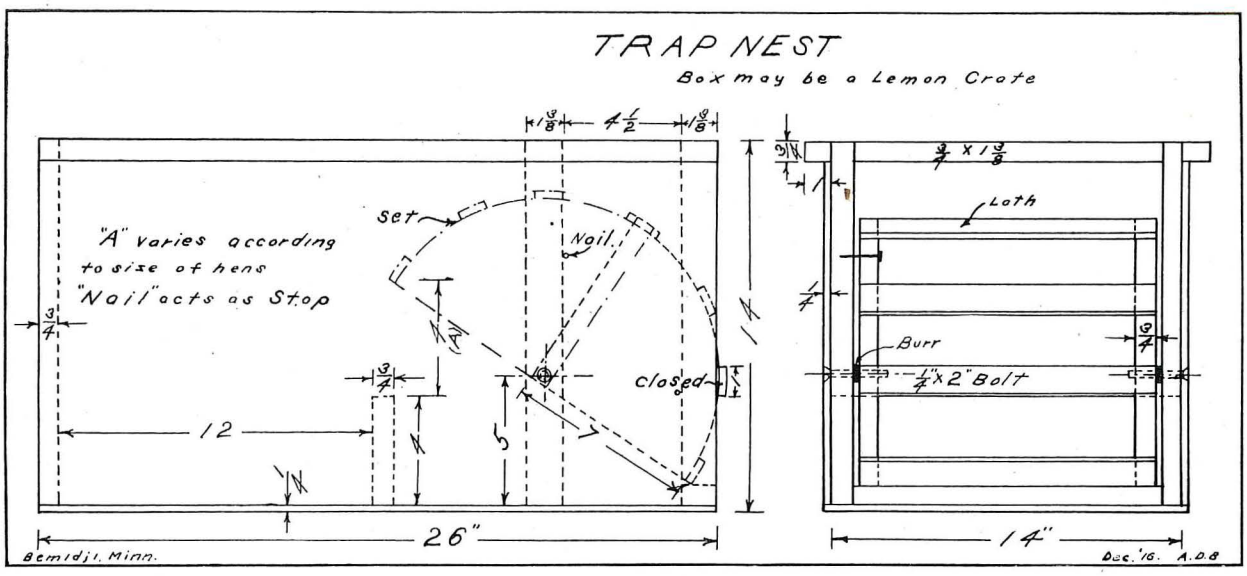
Having discovered that after a full course in sewing taken in high school, many girls know almost nothing about the mechanism and care of a sewing-machine, I have for some time been giving what I call a machine examination. A girl may, with good luck, go thru an entire course and never be obliged to reset a needle or oil a machine (which is usually attended to regularly by some one appointed for that purpose) and even tho she may use an attachment, she may have managed not to have adjusted it. In a large class where all use the machines, with scarcely a moment between, the pupil may find things ready for her use and never have to adjust for herself. Some of the class will learn these things but unless each girl is required to give a demonstration of her ability to *use* a sewing-machine, she may get away with only the knowledge necessary to stitch a straight seam or a hem. The instructions given by the teacher, at the beginning, are by most of them ignored frequently and sometimes entirely forgotten.

Usually there are several "makes" of machines in a room, so it is well to allow some latitude. The examination may be taken entirely at one, or part of it on each of several machines, as the pupil prefers. As such examination or demonstration requires a great deal of time, each pupil taking it alone, necessarily, (or possibly two at different machines—the instructor could hardly take care of more at a time) a number of days, perhaps two weeks, should be allowed. It should not be necessary to finish at one sitting. If each girl has a list of what she is to do, credit may be noted as each is finished and when the entire list is completed, the grade may be computed. The pupil should be required to study the book of directions accompanying the machine. Personally, there is no one thing which I have found more beneficial in the whole course than this demonstration. Nothing has elicited from the pupils more expressions of satisfaction for something learned which they felt to be of lasting benefit. At the time, many may find it irksome and it is one of the most tedious lessons for the instructor, but since trying it and finding it so very helpful, I should be very loath to omit it from the course. It should be given some time near the close of the work in making underwear, as much of the really necessary knowledge about the machine should be in the girl's possession by this time.

Each instructor can make her own list and allow as much credit for each as she desires. Some demonstrations take but a few seconds and others require several minutes. It is fairly satisfactory to allow ten credits to each, but in reality using the attachments and oiling the machine are worth more. Give only three attachments, the hemmer, the ruffler, and the tucker, these being most frequently used, and if the pupil has learned to adjust and use these three, she can, by referring to the book of instructions, use any other if she possesses ordinary intelligence. The list as I have used it is as follows:

1. Unbelt and belt the machine.
2. Remove and reset needle, explaining position necessary for needle.
3. Wind and place bobbin, explaining direction from which thread should come.
4. Thread machine, pulling lower thread up by means of upper.
5. Tell how to alter length of a stitch.
6. Tell how to alter tensions.*

*Be sure presser foot is down when upper tension is altered. Show why. Require pupil to explain that lower tension should seldom need altering.



7. Adjust and use tucker, explaining how to increase and decrease size of tucks and space between.
8. Adjust and use ruffler, explaining how to increase or decrease fullness and how to estimate amount of goods necessary.
9. Adjust and use hemmer.
10. Tell where to oil machine.

A TRAP NEST.

A. D. Bailey, Bemidji, Minn.

This trap nest is offered because it has some commendable features. It has been successfully used in the vicinity and was exhibited at a recent poultry show.

In making the nest, a lemon box may be used if desired. It should be widened out to 14 inches. The segment-shaped part is rolled up until a space of about 4 inches only is left open above the $\frac{3}{4}$" by 4" board, which fronts the nest proper. A hen stepping over the board strikes the edge of the segment-shaped part with her back, the part dropping to the position shown. They are made with a $\frac{3}{4}$" by 1" strip running the full length of the nest, so that they may be slipped under the dropping board in the same manner as a drawer.

NEW BOOKS.

The Psychology of Drawing.

By Fred C. Ayer. 172 pages. Price, $1.25. Warwick & York, Baltimore, Md.

This book will be of interest to drawing and art teachers as well as teachers of science thru drawing, to whom it is particularly addressed. It is written with special reference to laboratory teaching thru drawing but the conclusions reached by the author, supported by extensive experiments, are applicable to the impression of art as well as of science. The text includes a survey of literature on the psychology of drawing which is valuable to teachers of drawing and art.

Nursing as a Vocation for Women.

By Katherine M. Olmsted, Extension Division Bulletin, University of Wisconsin.

This twenty-page booklet, whose author is a nurse with considerable experience, gives in clear, concise language a very comprehensive discussion of nursing as a profession. It discusses the qualifications required of a nurse, the necessary training, characteristics of various training schools, describes the duties of a nurse in training, together with considerable information regarding the opportunities for securing positions and the remuneration.

Persons whose work calls for a knowledge of this character will find this a very helpful publication.

The Printing Trades.

By Frank L. Shaw. Cloth, 96 pages. Price, 25 cents. Survey Committee of the Cleveland Foundation, Cleveland, Ohio.

This section of the Cleveland School Survey Report presents an accurate analysis of printing as a trade and discusses the educational facilities of Cleveland for preparing boys to enter it. The study makes clear what every one connected with the printing industry has long felt, namely, that the trade is one of the steadiest, cleanest, best paid of all the mechanical occupations. The report further makes clear that while 1,300 boys now in the Cleveland schools will work in printing shops none are receiving specific education for their future jobs. The report suggests that trade courses for boys who desire to enter printing be established in junior high schools or in a general trade school, that compulsory continuation courses be formed for apprentices and that advanced trade courses for journeymen be established in the evening schools.

First-Year Lathe Work.

A text for students. Paper, 64 pages. Price, ten cents. The South Bend Lathe Works, South Bend, Ind.

This modest little booklet offers in "job" form, a year's course in lathe practice for high school beginners. It is made up of exercises that have a definite value and are not intended to merely use up stock. The student is required to make a complete 8-inch bench grinder that may be used in the school shop or in any workroom where tools must be ground. The thirty "jobs" are carefully graded to illustrate every important principle in the use of a lathe. Accurate work is insisted upon and it is made plain that carelessness in any operation will affect the final usefulness of the grinder. The directions to the student are complete enough to relieve the instructor of endless explanations. The drawings are splendid examples of good shop drawing. A copy of the booklet ought to be in every school shop.

Direct Current Motors.

Book VI of the School of Practical Electricity. Cloth, 136 pages. Price, $1.50. Electroforce Publishing Co., Milwaukee, Wis.

This volume contains the practical theory and practice of electricity and is intended for electricians and students in electrical engineering courses. In addition to the theory and mathematics of the direct current motor, the book presents a large number of laboratory experiments calculated to test the student's knowledge and to provide him with practices and tests which he will make as a practicing engineer.

An interesting chapter of the book illustrates and describes practical applications of the use of motors in various types of industrial establishments and for various types of machinery.

NOW, ARE THERE ANY QUESTIONS?

This department is intended for the convenience of subscribers who may have problems which trouble them. The editors will reply to questions, which they feel they can answer, and to other questions they will obtain replies from persons who are competent to answer. Letters must invariably be signed with full name of inquirer. All questions are numbered in the order of their receipt. If an answer is desired by mail, a stamped envelope should be enclosed. The privilege of printing any question and reply is reserved. Address, Industrial-Arts Magazine, Milwaukee, Wis.

Books on Sheet Metal Work.

Mr. J. I. Lockhart, teacher of manual training at Houston, Texas, suggests the following books on sheet metal drafting to H. A. H. (question 562, January, 1917).

Sheet Metal Drafting (textbook). Published by the New York Trade School, New York, N. Y.

International Library of Technology. Volume on Sheet Metal. Published by the International Textbook Company, Scranton, Pa. This book can be found in most public libraries.

Much useful information can be found in the magazine, *The Sheet Metal Worker*, and in the books published by the Sheet Metal Publishing Company, New York, N. Y.

Finish for Gumwood.

580. Q.—What is the best finish for gumwood? How would you go about putting a French finish on gumwood? —*E. H. J. R.*

A.—The best finish for gumwood depends on what effect is desired. An excellent finish may be secured by using the formula given for basswood; or the following will produce a beautiful finish:

Van Dyke brown Dissolve in one gallon of hot water, 5 oz. walnut crystals, ¼ oz. black P. B., and ⅛ oz. potash.

Coat with the hot stain, let dry over night, sand lightly with 00 paper two pieces of which have been rubbed together to take off the sharpness of the sand. Coat with two thin coats of white shellac reduced one-half with alcohol and slightly tinted with Bismark brown dissolved in alcohol. Coat with one to three coats of varnish after sanding the shellac coats with the worn out 00 paper. Let each varnish coat dry at least three days; sand smooth between coats; rub the last coat with water, FF pumice stone and felt pad until smooth and free from nibs. Clean off with a sponge and polish with chamois followed by a cleaning oil.

In regard to the method of putting on a French polish on gumwood, I cannot help but protest against the use, or abuse rather, of this finish. In the first place, I have yet to find an experienced finisher, in the true sense of the word, who would honestly say that he could "polish in French" under years of continuous practice; it simply cannot be done. True, I have seen exhibits of school projects on which a French polish had been attempted; but it was simply a smear of shellac and oil. A genuine French polish is a thing of beauty, delicate as a soap bubble, and as easily ruined. The finish should be as clear as crystal but the first few drops of water will strike down thru and the whole is ruined. The cheapest of varnishes carefully applied will produce a finish as handsome as French and will certainly stand much more abuse. However, for those who may wish to try their luck, the following will suffice:

First take a chunk of clean waste half the size of your fist, and cover it with a double fold of new cheesecloth, bringing the corners together so as to form a handle when twisted together. In a bottle put a pint of orange shellac and half a pint of paraffine oil; shake well until well mixed. Put a few drops of oil on the pad, rub in well with the hand and then put on ten drops or so of the shellac mixture. With a quick, light circular motion rub on the wood until the pad begins to feel "tacky," stop the circular motion, work very lightly with grain. The skill of the operator will be necessary to avoid streaky work. It is just as reasonable to expect an eighth-grade boy to go out and build a house that looks shipshape and tight as it would be for anyone without years of experience to produce a real French polish, and when all is said and done what kind of finish have you produced—something that will last just long enough to take out of the shop and be spoilt with a shower before it can be taken home.—*Ralph G. Waring.*

Rush Seating.

596. Q.—I would like to know where to purchase a spool of fibre rush seating, procurable in spools of about one hundred pounds each, light brown.—*L. K.*

A.—Genuine rush can be had from L. and J. G. Stickley, La Fayette, N. Y. Imitation rush can be obtained from Lusky, White & Coolidge, 65 W. Lake St., Chicago, Ill.; Fibre Grand Co., Grand Rapids, Mich.; or the Everett Frain Company, 3940 Wabash Ave., Chicago, Ill.

Plaster Models.

597. Q.—I find in my classes need for models of, as for example, columns of the Doric, Ionic, and Corinthian style, temples, triumphal arches, etc. Have you knowledge of the manufacture or sale of such models or something which could be used as a substitute?—*W. W. W.*

A.—Plaster models of architectural details, particularly of the Five Orders, may be obtained from a number of manufacturers of plaster casts. The nearest course of supply in the Middle West is the National Art Supply Co., 122 S. Michigan Ave., Chicago, Ill.

The casts can also be had from P. P. Caproni & Bros., Boston, Mass.; The Sculptured Arts Co., 118 W. Brookline St., Boston, Mass.; C. Hennecke Co., 1353 N. Pierce St., Milwaukee, Wis.

If you want measured drawings of the Orders and of other architectural detail, you can obtain various sets of plates from the Book Department of the American Architect, New York City; Bruno Hessling Co., 64 E. 12th St., New York City; Wm. T. Comstock Co., 23 Warren Ave., or from G. Broes Van Dort Co., 20 Jackson Blvd., Chicago, Ill.

Refinishing Mahogany.

601. Q.—Can you tell me the cause of the finish on a solid mahogany piece of furniture turning to a whitish, cloudy appearance after being in use about two years?

The finish was five coats of white shellac over an acid stain of bichromate of potassium and oil filler. The furniture has been kept in a heated room with ordinary atmospheric conditions and the finish has been perfect until recently. I can in no way connect the cause with dampness or moisture, but possibly you can advise me. I would be very glad if you could suggest a way to restore it to its original appearance. —*F. L. D.*

A.—The fundamental cause of your trouble lies in the use of white shellac. Practically all mahogany finishes will turn gray in time if the shellac has been applied over the wood, in the white, without the use of any alcohol-soluble color as a tinting agent. Thru long study I have found that the neglect of this one factor in finishing mahogany has been responsible for the great majority of troubles occurring with this wood. After the wood has been stained and thoroly sandpapered, it should be given a coat of orange or white shellac, reduced with alcohol which has been tinted with alcohol-soluble Bismark brown to a slightly reddish color. This addition of color prevents the effect of grayness under the varnish or shellac coat. The second mistake on the part of the questioner was the further use of shellac in completing the finish of his furniture. Mahogany should not be finished exclusively with shellac, as this material has the ability to absorb moisture and atmospheric gases with the result that the finish becomes greatly impaired with time. The proper procedure, then, would be to sand the tinted shellac coat very lightly and then proceed to fill with a dark brown oil-silex filler. Allowing this to dry 24 hours, it should then be coated with four successive coats of Pratt & Lambert's No. 61 varnish, allowing a week between coats; thoroly sanding the first two with 00 sandpaper and rubbing the last coats with pumice stone, felt pad and water to a perfect surface. Clean up in oil.

As to a method of restoring the shellac coats to their original appearance, I fear there is little that can be done other than by an expert practical finisher who would resort to polishing the furniture in French. However, if the questioner cares to take a chance he may use the following formula:

Ninety-five per cent alcohol, 240 c. c., mixed with 120 parts acetone over a water bath. In this mixture dissolve 8 parts of gum benzoin, 16 parts gum sandarach. Filter the solution carefully, add 440 c. c. of benzine. Shake well. This produces a perfectly clear liquid ready for a finishing polish. High percentage of benzine readily dissolves any free oils remaining from previous polishings, gives a high state of very permanent polish not liable to dullness or cracks. In applying this make up a pad of sheeting or similar non-linting material, large enough to cover the hand. Pour on a teaspoonful or two of polish, fold the pad together and rub so as to evenly distribute the oil; with this pass quickly over the shellac, exercising great care not to rub the shellac with the pad. I would advise in starting, to use this method on some portion of the furniture not easily seen. In this way the operator can learn how to handle his cloth and his polish before reaching portions of the furniture which are most conspicuous. It is a very good rule in work of this kind whether painting, varnishing, or polishing to "start with the thing you see the least and end with that which you see the most." In this way one avoids back tracking and untidiness about the work.—*Ralph G. Waring.*

Art Metal Etching.

610. Q.—Will you please answer the following questions as to etching in art metal work? How may the varnish asphaltum be thinned? In what acids, and what per cent may the copper be immersed? What reference book would you recommend for a beginner in this work?—*L. R.*

A.—The asphaltum varnish used in etching to protect the metal may be thinned if necessary with a little turpentine. It is then applied with a brush, and left to dry thoroly. The design may be formed while painting on the varnish or in the case of minute detail can be scratched thru the varnish, when dry, exposing the copper or brass. The back and edges of the metal as well must be protected from the acid with a coat of the varnish. Be sure the varnish is well dried before immersing the piece in the acid bath.

In a porcelain, earthen or glass dish mix the etching bath or solution thus: To two parts of water add one part of nitric acid. When the piece is immersed the acid should start to act on the bare metal in a few minutes; small bubbles rise slowly from the surface of the metal as the result of this action. Should the solution not start to act within five minutes the bath is not strong enough and a little more nitric acid should be added. Should large bubbles rise very quickly, the acid appear to boil, and throw off a strong yellow fume when the metal is immersed, the solution is too strong and more water should be added. When etched deep enough the asphaltum varnish is dissolved from the metal with turpentine or gasoline.

Payne's Art Metal Work, published by The Manual Arts Press, Peoria, Ill., is a good book for the beginner interested in art metal etching.—*Louis J. Haas.*

Coppering Iron.

612. Q.—Can you advise me how to color galvanized iron by acids, alkalies or heat, in the greens, purples or blues that may be given to copper or brass? The high price of copper and brass has caused us to use galvanized iron in their stead for art hinges, corners, and decorations, but we have not found any satisfactory ways of coloring it.—*E. M. H.*

A.—It seems very foolish to use galvanized iron for the purpose mentioned. Why not use Ryerson & Son's (Chicago, Ill.) pickled steel sheets to make these hinges? The sheets are especially made for such purposes as art metal work and can be had in any gauge desired. After the hinges have been made dip them in a coppering solution, then treat them with liver of sulphur to oxidize just as you oxidize ordinary copper.

The following simple method of copper plating iron is taken from Hawkins' *The Polishing and Plating of Metals*, (Hazlitt & Walker, publishers, Chicago) and is thoroly satisactory:

Simple Immersion Coppering—A very cheap copper plate may be deposited upon iron or steel objects by first cleansing them by dipping into or brushing with a strong solution of hot sal soda (caustic soda). When clean give a quick dip, moving about constantly, into a solution of sulphate of copper and sulphuric acid about as follows:

Sulphate of copper	1½ oz.
Sulphuric acid	1 oz.
Water	5 qts.

The articles, if left in the solution after the film or plate of copper is formed, are liable to redissolve, or peel, so they should be removed quickly and rinsed in plenty of cold and then in hot water and dried.

After the hinges have been coppered treat them with liver of sulphur to oxidize them, just as you would oxidize a piece of copper.—*Thomas F. Googerty.*

Fuming White Oak.

613. Q.—We want to do some fuming, in fact, a lot of it, but found that nearly every piece of white oak in the shop had some sapwood in it. Of course, this remains white after fuming. I have tried using tannic acid, but so far have not been able to match colors. I can only obtain a yellow on the sapwood with acid. How much acid should I use in water and how apply it?—*S. L.*

A.—In the standardization of fuming colors on oak, I have found that some experimental work is necessary in order to study the peculiarities of the local oak lumber. As a means to this end, I constructed a box with five sides, of 1¼″x2″ stock, with a half inch rabbet on one edge to allow for glass and putty. This box was approximately 18″x24″ x36″, the sides being glass panels. It is also an advantage to have the top of glass, the entire frame being so constructed as to permit the five panels being fastened together in box form with 3″ round head screws. An empty varnish can may be cut in half the long way of the can, so as to leave the handle on the portion desired for use as an ammonia pan. In order to fill this latter, a hole should be bored in the top of the case large enough to let the stem of a glass thistle tube reach down into the pan. After a pint of ammonia water has been poured into the can, the tube can be closed with a cork to prevent the loss of gas. In using this frame it may be placed on top of an old table or similar flat surface.

Samples of the various grains and colors of oak available should now be used. Starting with a solution of 3 ounces each of pyrogallic and tannic acids per gallon of water, one sample of the oak should be coated with this solution. Take out a portion of the standard solution, reduce one-fourth with water and coat a panel. Remove another amount and reduce one-half with water, using it to coat the third panel. Any number of reductions may be carried on according to the desire of the operator. These panels so prepared should be allowed to dry thoroly, sanded lightly with 00 paper to a perfect smoothness, BEFORE fuming. These panels should be placed in the fuming box and the time noted for the necessary depth of color. When this point is reached, the samples should be withdrawn and the upper half of each coated evenly with a solution of raw oil and turpentine, half and half. Let this oil dry very thoroly in a warm place, then coat entire panel with orange shellac reduced one-half with alcohol. When this is completely dry the panels should be lightly sanded with worn out 00 paper and coated with some good waterproof flat varnish, such as Moller & Schumann's Hilo Flat Varnish.

If the data as regards reduction of standard solution, sanding, time required for fuming, presence or omission of the oil coat, number of coats of shellac and number of coats of flat varnish are noted on the back of these panels, an invaluable amount of data will be soon collected with small effort and when handling large projects in the fuming box, may prevent some unpleasant surprises and disappointments. Fuming produces beautiful colors, on oak especially, but this same formula will produce similar colors on almost any wood except California redwood.

It sometimes happens that sap material finds its way